DOCUMENT RESUME

ED 209 047 RC 013 011

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|---|---|
| TITLE | Instructor's Field Manual: North Carolina Outward Bound School. |
| INSTITUTION | Outward Bound, Morganton, N.C. |
| PUB DATE | 80 |
| NOTE | 210p.; For a related document, see RC 013 010. |
| AVAILABLE FROM | North Carolina Outward Bound School, P.O. Box 817, Morganton, NC 28655 ($6.50). |
| EDRS PRICE | MF01/PC09 Plus Postage. |
| DESCRIPTORS | Adventure Education; Camping; Equipment; *Experiential Learning; *Field Instruction; First Aid; Foods Instruction; Group Dynamics; *Learning Activities; Outdoor Activities; *Outdoor Education; Physical Environment; Rescue; *Resource Materials; Safety; Teaching Methods; Young Adults |
| IDENTIFIERS | Natural History; North Carolina; North Carolina Outward Bound School; *Outward Bound; *Survival Education |

ABSTRACT

A supplement to the North Carolina Outward Bound School's Instructor's Handbook, this field manual presents useful, but not required, information gleaned from old timers and resource books which may enable the instructor to conduct a better course. Section one considers advantages and disadvantages and provides directions and topographical maps for solo sites and campsites in the Table Rock, Green Cave, Toe River, and Worley's Cave areas. Section two delineates responsibilities of the logistics staff and procedures they use to organize the flow of equipment, transportation, and food. Section three reveals supplementary information about the area's geologic, human and natural history; natural phenomena; signs of time and direction; environmental concerns; and weather. Section four describes activities to build cooperation, talking games, solo activities, night activities, caving activities, simulations, Tyrolean traverse, and the ropes course, plus guidelines for cave leaders and lead climbers. Section five describes advanced rescue techniques including hauls, brakes, anchors, litter carries, rappel rescue, ropes course rescues, zip wire rescue system, and cave rescue. Medical concerns examined in section six include first aid kits, drugs, blisters, diarrhea, stings, bites, anaphylaxis, snakebite, and hypothermia. Section seven concentrates on winter considerations (first aid, frostbite, clothing, food, and equipment). Appendices present origins of names and knot diagrams. (NEC)

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ED209047

# INSTRUCTOR'S FIELD MANUAL

# NORTH CAROLINA OUTWARD BOUND SCHOOL

## ACKNOWLEDGEMENTS

The idea of a Field Manual was originally conceived by Mike Fischesser, who wanted to pull together various pieces of information that were lying around in various forms in various places. The field manual was first put together in 1979 by that year's layover staff: Ken Murphey, Lynne Godshall, Lyle Dean, Dave Hendricks, Aram Attarian, Linda Ramsey, Tina Gonzalez, Clem Dabrowski, and Cath Johnson--each of them writing different parts, with Mike contributing some as well. In 1980 this original was revised, rewritten, & enlarged by Cate Huisman, who did most of the writing and editing, & Liz Cornish, who did some of the research and writing, made the preparations for printing, and did all the typing. Kevin O'Connor, Cath Johnson, Tina Gonzalez, and Dodie Maxted all read the text and made useful suggestions. Dave Hendricks provided some new technical drawings, and Lynne Godshall prepared the maps. Through it all, Mike Fischesser helped us to keep the original purpose in focus and answered hundreds of questions.

Special thanks to Don Obert for the section on lightning, Kevin O'Connor for coaxing the Green Cove history out of Pid, and John Logsdon for showing us how to tell time by the moon.

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RC 013011

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## AN EXPLANATION

The English language has yet to produce an acceptable genderless pronoun. *She/he*, *(s)he*, and *she-or-he* are all graceless and unpronounceable; the constant use of the non-commital *they* and *their* is clumsy and confusing. *He* and *his* are clear, simple, sexist, and proper. *She* and *her* are clear, simple, sexist, and different.

We've opted to be different. Whenever a personal pronoun is called for, we've used *she* or *her*. We've done this simply for the sake of clarity and simplicity. And difference.

-cfh

## PURPOSE OF THE FIELD MANUAL

The *Field Manual* is a supplement to the *Instructor's Handbook*. The instructional staff of NCOBS is REQUIRED to know the material in the Handbook. This is necessary for the instruction of a safe and high-quality course at NCOBS. All safety policies are indicated by an asterisk (*) in the Handbook. It also contains history, philosophy, objectives, methods, procedural guides and *necessary* information on all activities.

The *Field Manual* contains useful, *but not required*, information, gleaned from old-timers and resource books, which may enable the instructor to conduct a better course. It is a timesaver; it provides the instructor with information she would otherwise have to seek elsewhere. It also expands upon many items in the *Instructor's Handbook*. It is *not* intended to be a wild foods guide, rescue manual, natural history guide, or ecology text. There are more thorough resources addressing those topics in the NCOBS Technical Library.

Safe and high-quality Outward Bound courses cannot be conducted through the use of the *Instructor's Handbook* and *Field Manual* alone. Sometime during the instructor's career, that unusual or non-textbook field situation will arise which a method or policy does not cover. These situations, sometimes critical, demand good judgement. The instructor must reach into her bag of tricks and possibly *improvise* a solution from the many methods she knows. This may be the biggest advantage of manuals and handbooks. They provide a background and set of standards, which, if studied, will be the basis for sound decisions in tight situations.

-Mike Fischesser
Program Director
February 1980

# CONTENTS

Page

ORIENTATION TO NCOBS (White) ........ 1

Course Areas ........ 3
- Table Rock ........ 3
- Green Cove ........ 19
- River Program ........ 32
- Worley's Cave ........ 40

LOGISTICS (Blue) ........ 45

Equipment ........ 46
Transporation ........ 55
Food ........ 58

THE COURSE ENVIRONMENT (Canary) ........ 65

Geologic History ........ 67
- Pleistocene Ice Sheets ........ 67
- Cave Formations ........ 68

Human History ........ 71
- The Wilderness Act ........ 80
- Human Phenomena ........ 80

Natural History ........ 85
- Common Trees ........ 85
- Useful Plants ........ 88
- Common Mammals ........ 89
- Common Birds ........ 92
- Some Tips on Spotting Wildlife ........ 94

Natural Phenomena ........ 96

Natural Signs of Time and Direction ........ 98
- Stars ........ 98
- Sun ........ 98
- Telling Time by the Moon ........ 98

Environmental Concerns ........ 101
- Backwoods Ethics ........ 101
- Cave Ethics ........ 109
- The Litter That Lingers ........ 110

Weather ........ 112
- Forecasting ........ 112
- Lightning ........ 117

Page
ACTIVITIES (Buff) ................................ 125

More Initiatives, Activities, and Talking Games..... 126
- Activities to Build Cooperation.................. 126
- Talking Games.................................... 127
- Things to Try with Other Crews................... 129
- Solo Activities.................................. 129
Night Activities.................................... 130
Caving Activites.................................... 130
Simulations......................................... 133
Tyrolean Traverse................................... 137
More About the Ropes Course......................... 138
- General Descriptions............................. 138
- Philosophy of Design............................. 138
- Safety System.................................... 139
- Special Considerations for Some Events........... 140
Requirements for Cave Leaders....................... 141
Guidelines for Lead Climbers........................ 142

RESCUE (Green) ..................................... 145

Search, Rescue, and Evacuation...................... 146
- Individual Responsibilities...................... 146
- Search Techniques................................ 147
- Rescue Pack Contents............................. 147
- Hauls, Brakes, and Anchors....................... 148
- Litter Carries: Horizontal, Vertical, and Telpher Lines................................. 155
Specific Rescue Techniques.......................... 160
- Methods of Relieving Weight from the Waist of a Conscious and Unconscious Climber............ 160
- Seven Steps to a Rappel Rescue................... 163
- Ropes Course Rescues............................. 163
- Zip Wire Rescue System........................... 166
- Cave Rescue Call-Down............................ 167

Page
MEDICAL CONCERNS (Goldenrod) ...................... 169

First Aid Kits.................................... 170
Drugs in NCOBS First Aid Kits..................... 172
Supplemental Information on Common Medical Problems 178
- Blisters....................................... 178
- Diarrhea....................................... 179
- Stings, Bites, and Anaphylaxis................. 180
- Snakebite...................................... 182
- Hypothermia.................................... 185
Emergency Telephone Numbers....................... 188

WINTER COURSES (Pink) ............................ 189

First Aid in the Winter........................... 190
Frostbite......................................... 190
Clothing for a North Carolina Winter.............. 192
Food.............................................. 195
Tips on Winter Equipment.......................... 196

APPENDICES (White) ............................... 199

Origins of Names.................................. 200
Knots............................................. 204

# Orientation to NCOBS

# ☐ COURSE AREAS

## TABLE ROCK

Table Rock was the first location of NCOBS. The original board of directors selected the site in 1965, attracted to the Linville Gorge. Extensive negotiations followed to lease the property from the Forest Service and to assure local residents and users that the property would not be overused and abused. The following autumn (1966), Lance Lee--a former HIOBS instructor—and four friends camped out at the site and started construction. They returned in the spring of 1967 with even more friends to complete the first base camp. This included tents on platforms for staff and students, a mile of new road, mobile homes for temporary housing of staff families, and a dining hall constructed from the timbers of the former Morganton Furniture Company, donated by Mr. A.K. Phillips. (The remains of the tent platforms, which were replaced with cabins in 1973, may still be found below the warehouse and near the Bastard and Utopia Trails. The dining hall and mobile homes are still as they were). The school was dedicated on 2 July 1967 by Mrs. Emma Clark, postmistress at Jonas Ridge.

Karl Rohnke constructed one of the first ropes courses on the ridge south of the present zip-wire. Later he constructed another one below and southeast of the warehouse. Remnants of both may still be found in these areas. The present ropes course, designed by Mike Fischesser, was constructed and first used in the spring of 1976 (there is more about this ropes course on pp. 138 - 141).

Presently, NCOBS has a "special use permit" with the U.S. Forest Service: it is good from 1978 to 1997. The school and the Forest Service have an excellent working relationship and have successfully co-ordinated many rescues, evacuations, and service projects together.

The reputation and quality of experience at NCOBS has grown vastly over the years. This is largely attributable to the variety of activities and challenges offered in each course, and these in turn are facilitated by the Table Rock course area. The resources are numerous (caves, rocks, rivers, expedition areas); this enables the school to offer a wide variety of course activities in response to varying public need and demand.

While we are quite pleased with Table Rock, after 5000 students, we must constantly look for new ways to decrease our impact on the area. Hence, trails have been re-routed and switched-back to minimize erosion, the ropes course practice area has been moved, and the base of the baby slab has been covered with stone slabs to reduce erosion. Larger scale efforts to minimize our impact have included reducing crew size, reducing van travel, and seeking out new expedition areas when traditional ones show signs of wear.

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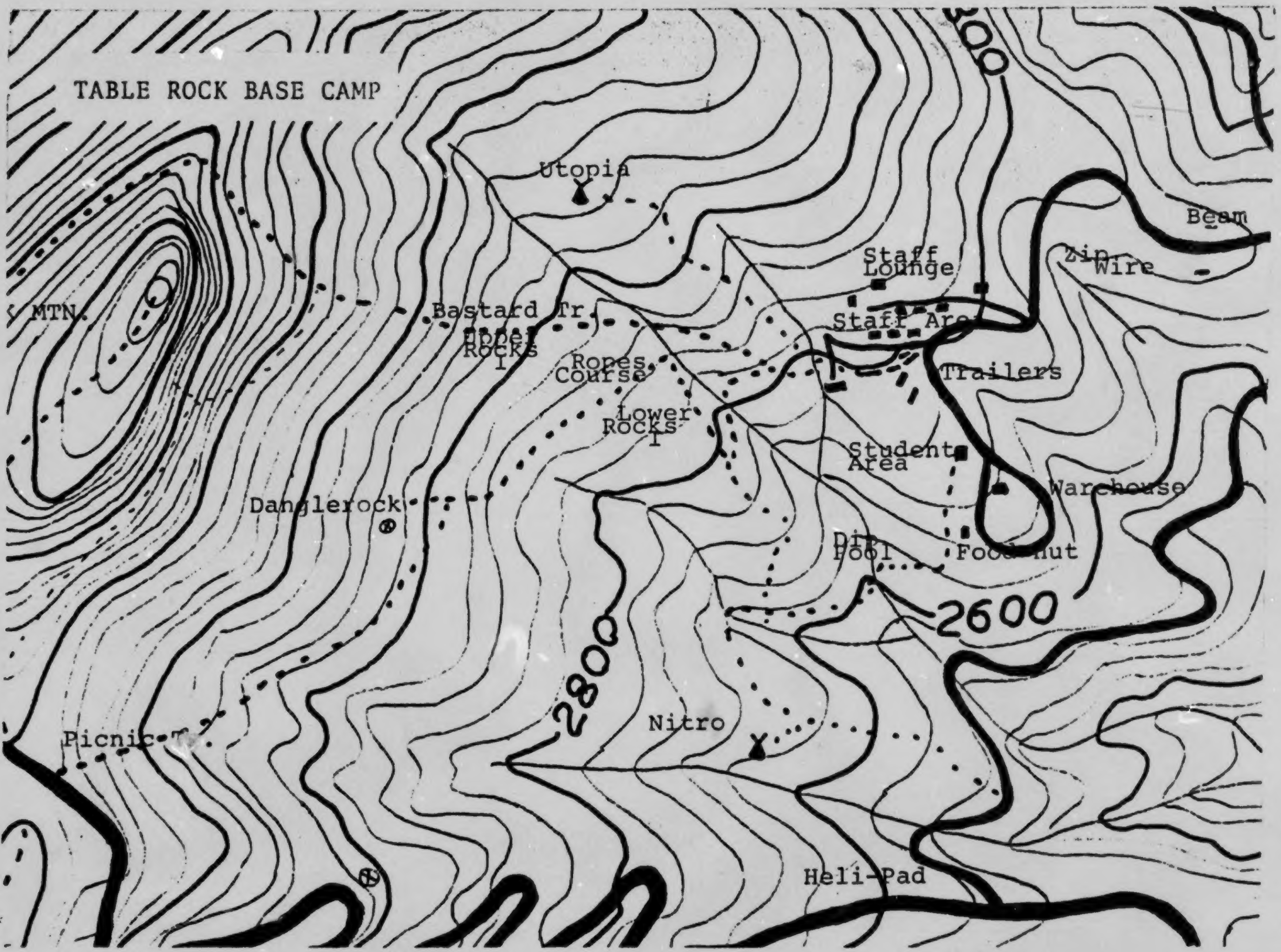
TABLE ROCK BASE CAMP
MTN.
Utopia
Bastard Tr.
Upper Rocks I
Ropes Course
Lower Rocks I
Staff Lounge
Staff Area
Zip Wire
Beam
Trailers
Student Area
Warehouse
Dip Pool
Food Hut
2600
2800
Danglerock
Picnic Tr.
Nitro
Heli-Pad

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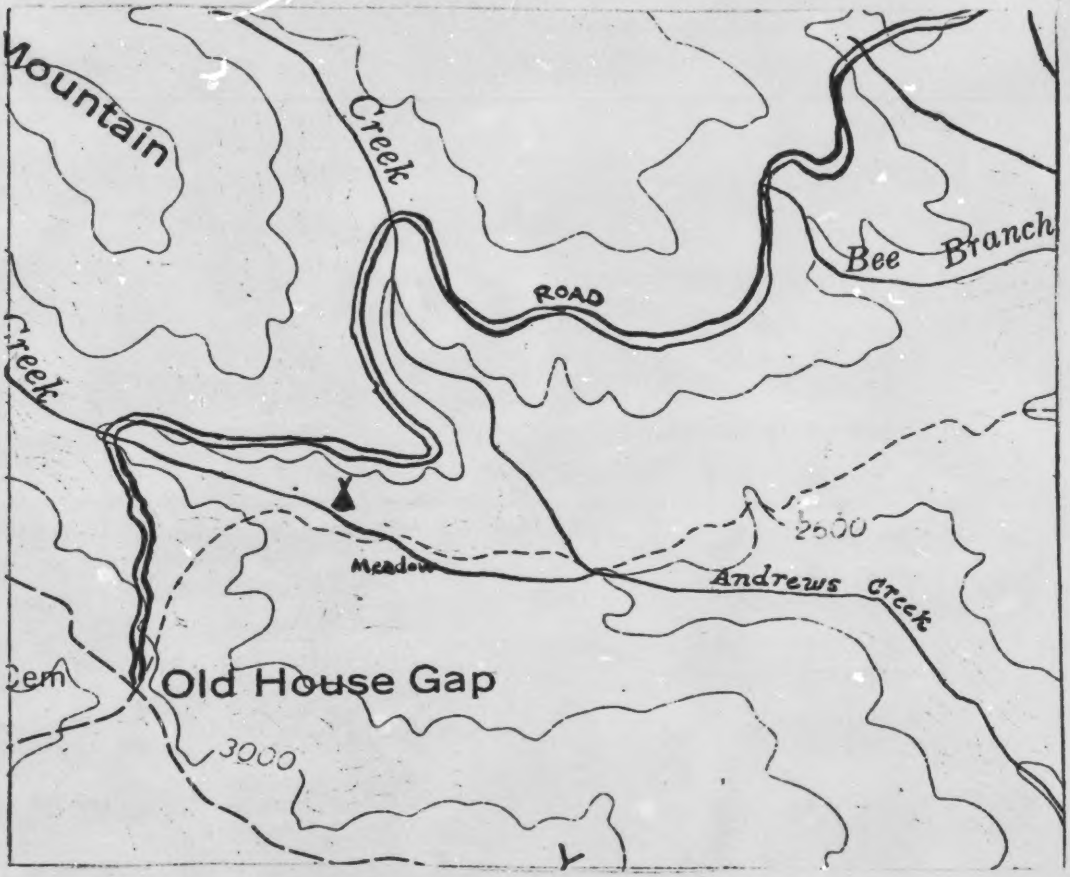
5

## ANDREWS CREEK SOLO SITE

Established: Summer 1977
Quadrangle: Grandfather Mountain
Directions: Follow the directions in the Driver's Direction File (DDF) to Wilson Creek solo area. After the sharp right towards Old House Gap go 2.5 miles and look for a steep dirt road to the left. 1/2 mile up, this road crosses Andrews Creek. Sites are downstream from the crossing and a large meadow, in a young coniferous forest on flat ground. They extend to the creek crossing. The dirt road serves as a trail for cairn checks.
Advantages: All sites are on the creek.
Disadvantages: Evidence of frequent camping at one spot, possibly weekend fishermen. May be crowded on summer weekends.


Mountain
Creek
Creek
ROAD
Bee Branch
Meadow
2500
Andrews Creek
Cem
Old House Gap
3000

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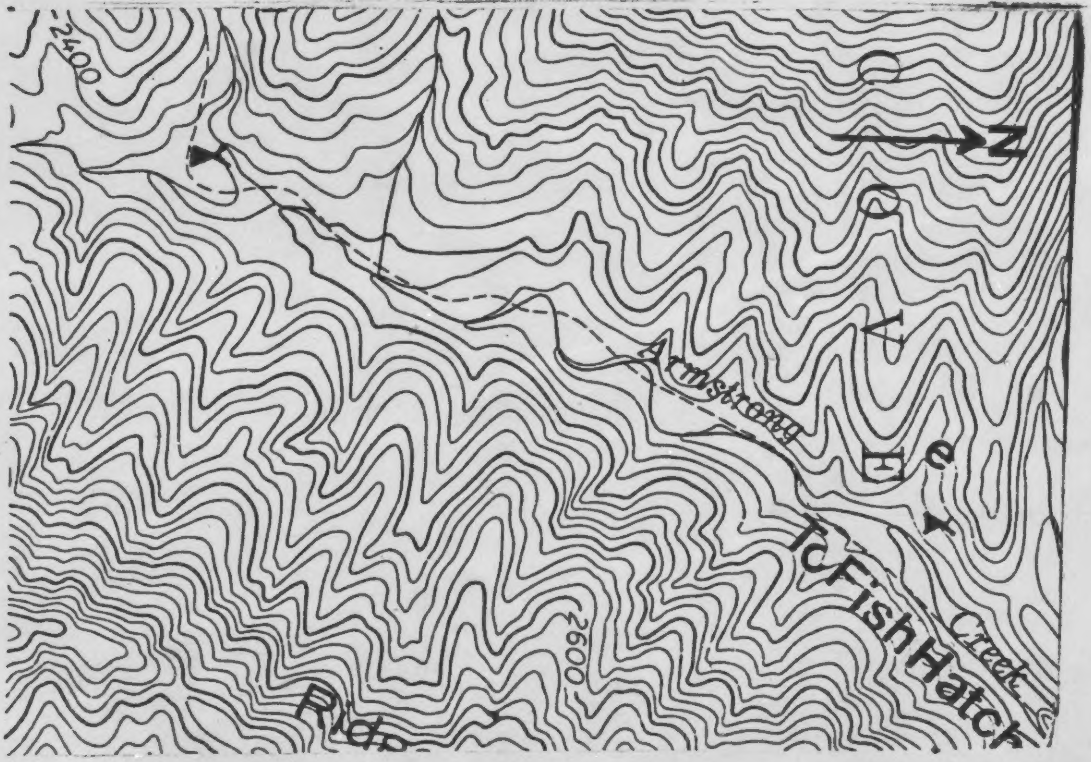
## ARMSTRONG CREEK SOLO SITE

Established: Summer 1976
Quadrangle Celo
Directions: Follow the directions in the DDF to the turnaround above Armstrong Fish Hatchery. Walk in about 1/4 mile past the turnaround to find a watchcamp site--you'll have to cross the creek a couple of times. Solo sites extend up the creek from here.
Advantages: You can also use the southern end of Armstrong--access from Hazelnut Gap trail. People at the fish hatchery are very helpful, and there is a possibility of doing service projects with them. In most places the trail can be used for cairns. If you use both the upper and lower ends of the creek, you can fit a couple of crews in. Convenient solo as a half-way point on an expedition to or from Mitchell. All sites are on the creek.
Disadvantages: The northern end has been heavily used and may be in need of a rest.



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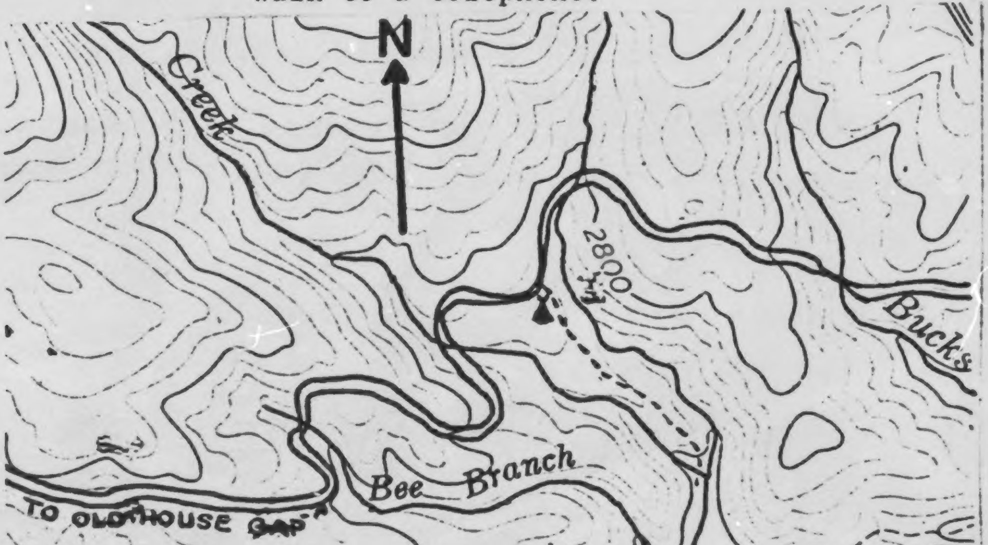
# BEE BRANCH SOLO SITE

| | |
|---|---|
| Established: | Summer 1976 |
| Quadrangle: | Grandfather Mountain |
| Directions: | Follow the directions in the DDF to Wilson's Creek Solo area. Take the trail behind the fisherman's camp and follow the creek to the fork with Bee Branch. Solo sites are back towards the road from the fork, on both sides of the creek. |
| Advantages: | All sites are on the creek. Due to thick growth and many bends in the creek, sites can be fairly close together. Excellent watch camp--flat, lightly wooded, and there are large pools just below the fork. It is near enough to the road to head off fishermen. Possible solo site for crews expeditioning to the Deerfield. |
| Disadvantages: | Students put too close to the road can be seen from its next switchback. Not good on weekends--too many fishermen. Long walk to a telephone. |



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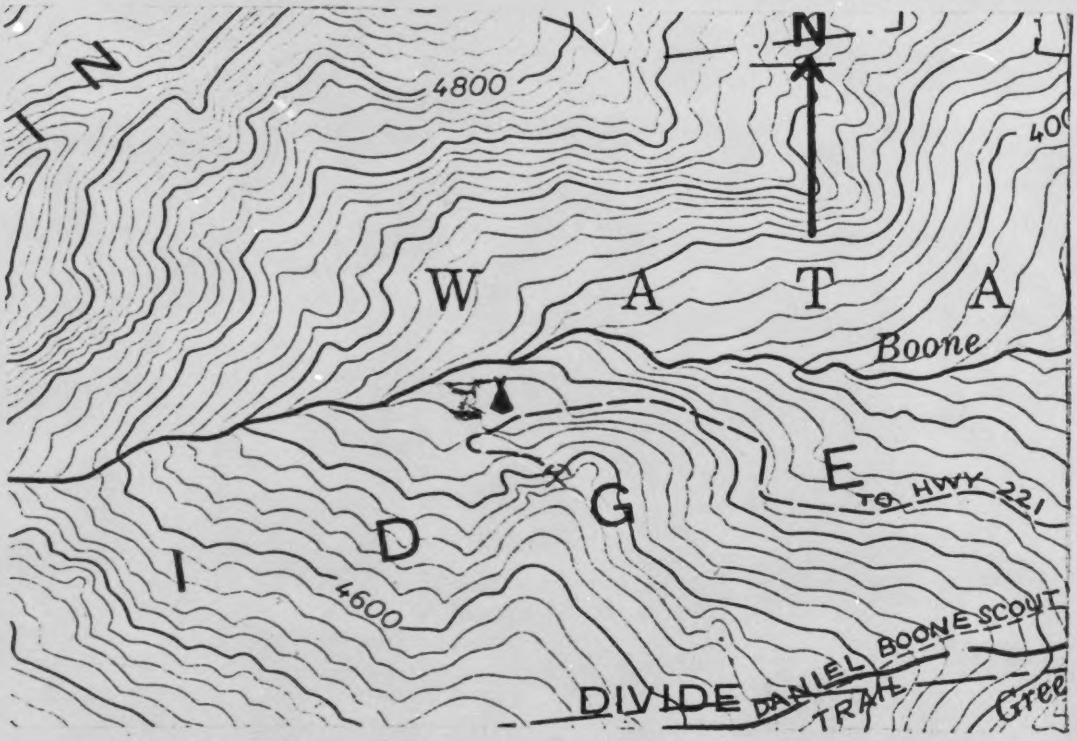
## BOONE'S FORK SOLO SITE

Established: July 1977

Quadrangle: Grandfather Mountain

Directions: Follow the directions in the DDF to Boone's Fork solo area. Follow the left fork to the parkway, cross over, and directly on the other side you will see a small trail (a few hundred yards to the right of the Daniel Boone trail). Follow this trail for about 1.5 miles; where the map shows a switchback just before the end of the trail, keep going straight ahead to the creek. Watchcamp can be on either side of the trail to the creek. (Note: The parkway crosses Boone Fork, but it is not shown on the map as it is incomplete as of this writing).

Advantages: The sites get better and better as you go downstream. All sites are on the creek. This is a good location from which to depart for Calloway Peak and do an expedition over Grandfather to the school for final.



## DOBSON'S KNOB SOLO SITE

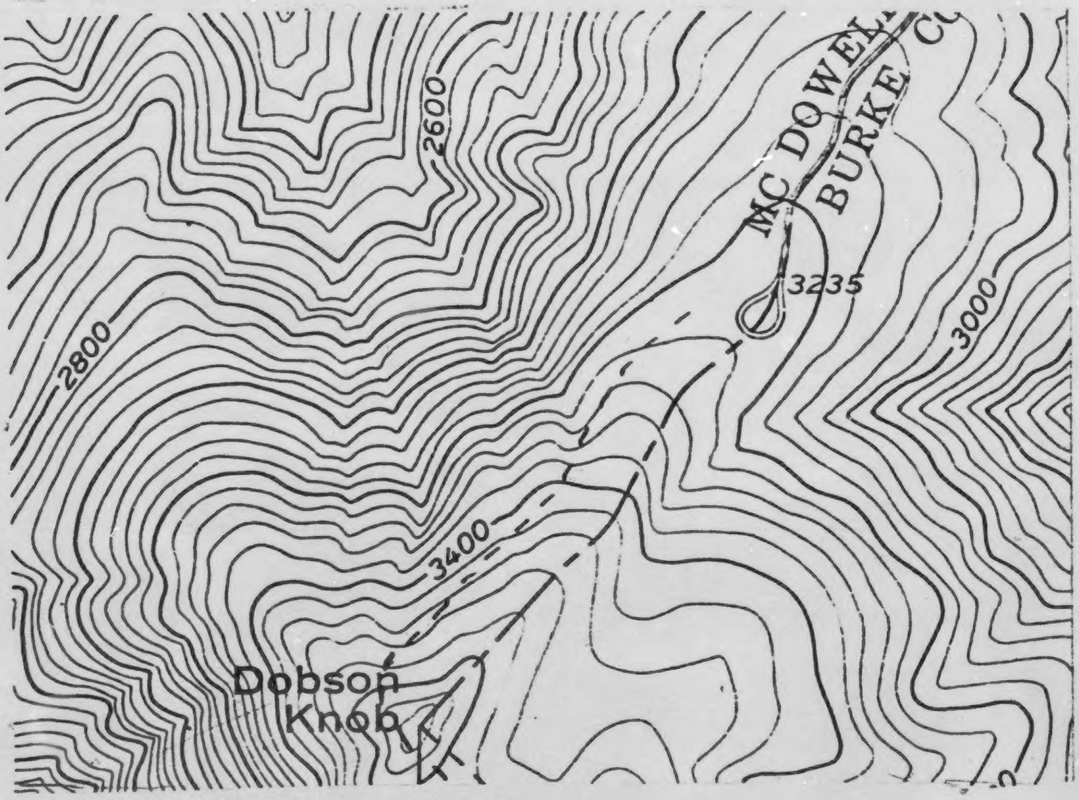
Established: Summer 1973

Quadrangle: Ashford

Direction: Follow the directions in the DDF to Dobson's Knob. Depending on the state of the road, you may be able to drive only to the saddle and have to walk the last couple of miles to the turnaround. The watchcamp may be either at the turnaround or towards Black Creek, which is the water supply. A trail runs up the ridge to Dobson's Knob from the turnaround; sites are on both sides of it.

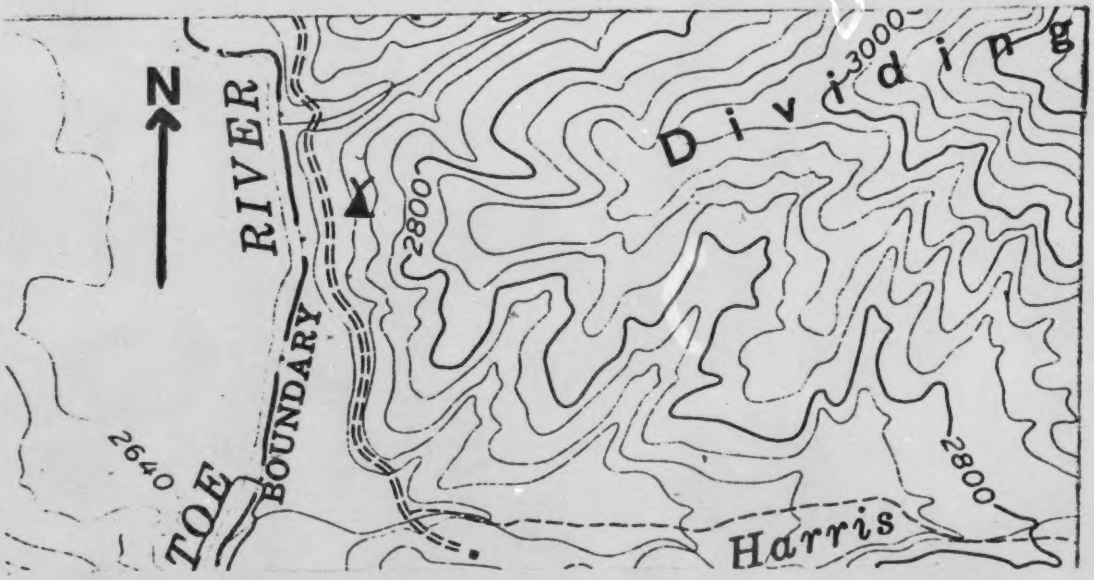
Advantages: Pleasant woodland area, some grassy spots, enough vegetation to make good sites. Possible solo for Mitchell expeditions. Sites are fairly remote, as access by road is poor.

Disadvantages: Have to carry water to all sites. You'll generally have to truck students at least one way, as the sites do not conveniently fit into standard expedition routes.



## HARRIS CREEK SOLO SITE

| | |
|---|---|
| Established: | May 1978 |
| Quadrangle: | Linville Falls |
| Directions: | Follow the directions to Pisgah Church in the DDF. Just past the church, turn left onto 194 and then left onto 19E. After approximately 2.5 miles, turn left at Green Valley Church. Go along Brushy Creek Road past the airstrip and take the road into the landfill. Continue past the landfill to a barn and have students walk from there over Laurel Creek to Harris Creek. There are numerous very good sites along Harris Creek and some of the side streams. There are also some good sites between the Toe River and the trail from Laurel Creek to Harris Creek. |
| Advantages: | The trail indicated is actually a woods road, making cairn checks easy. All sites are on creeks. White Oak Branch could be explored for further sites. |
| Disadvantages: | On Sundays several rafts come down the Toe--could disturb the students there. Very unattractive access through landfill (possible access down the trail from the parkway). Minor annoyances sometimes with small planes using the airstrip. Access through the landfill is not always open. |



## IRISH CREEK SOLO SITE

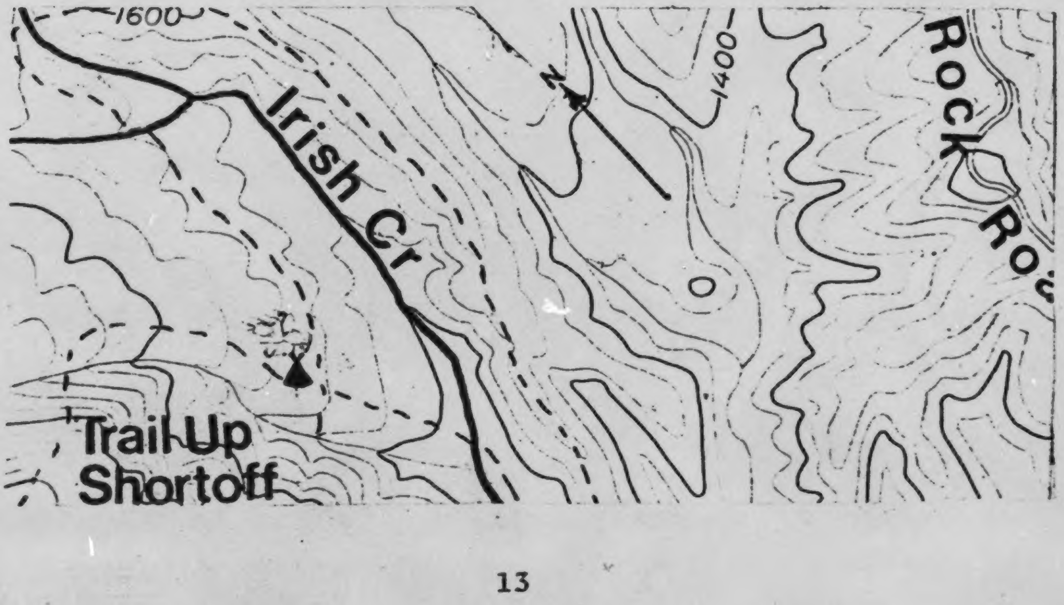
**Established:** Summer 1977

**Quadrangle:** Oak Hill

**Directions:** $2^+$miles down Table Rock Road from the school you will come to an old road on the right with a chain across it. Follow this trail about 2.5 miles until you come to the watchcamp at a road junction near Irish Creek. You'll cross 4 very old bridges--use extreme care! There are 2-3 sites on the trail leading to Shortoff, 3-4 on the same trail SE of the watchcamp, 4-5 on the old road from Table Rock Road, and 2-3 on the handdrawn trail on the map. This area is only lightly wooded so the sites have to be a fair distance apart.

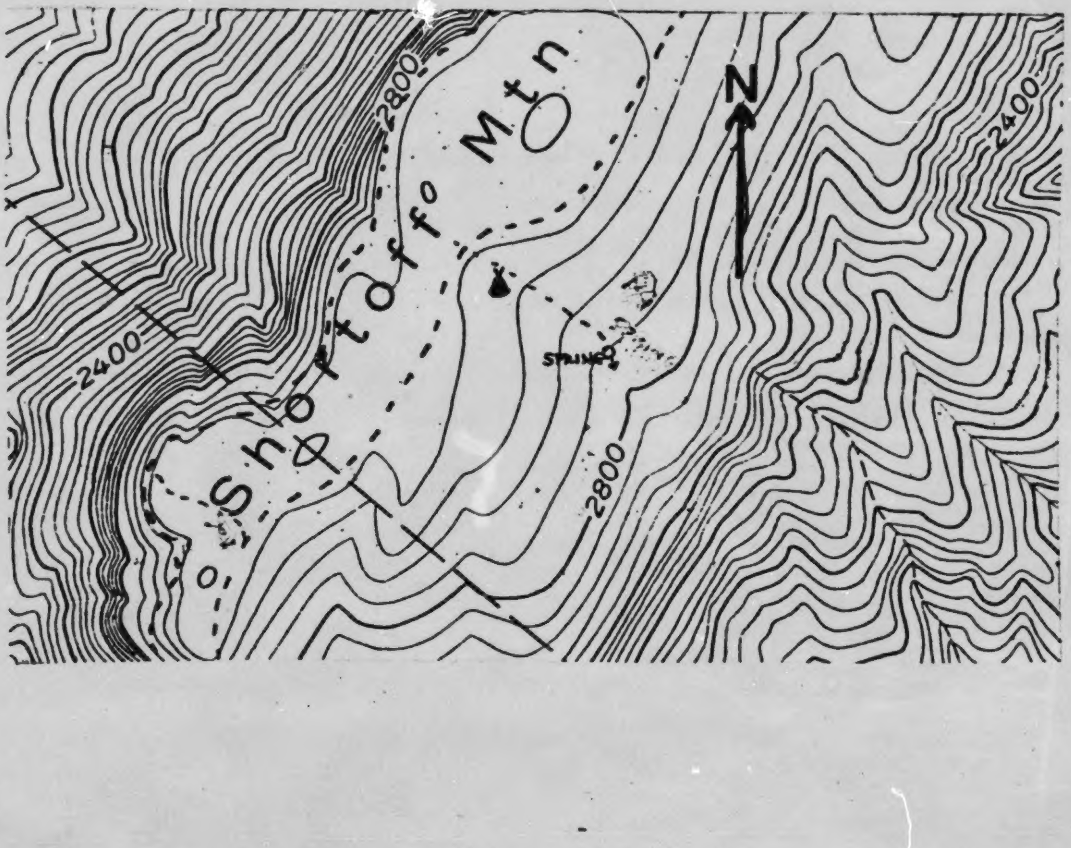
**Advantages:** Trails and roads can be used for cairn checks. The area is within easy walking distance of the basecamp. With sites along 2 or 3 different trails, none of them are very far from watch camp. Most sites are along creeks. The area is not used by the public much because there is no vehicle access.

**Disadvantages:** Sometimes you can hear vehicles on Table Rock Road. Some vacation trailers and the Table Rock Fish Hatchery are within easy walking distance of the solo site; this temptation might make it a poor solo site if you have students who may break solo. Students who might be tempted are best put upstream, so they would have to walk through the watchcamp if they decided to follow the road out.



## SHORTOFF MOUNTAIN SOLO SITE

| | |
|---|---|
| Established: | Many years ago! |
| Quadrangle: | Ashford |
| Directions: | Access to these sites is not possible by road. Hike there via either Irish Creek, Chimney Gap, or Wolf Pit Road. To get to the sites, hike out to the edge of the mountain on the trail shown on the south end of Shortoff. Follow the edge of the cliff around for sites. Once you get to what appears to be the end of the useful area, there is a small downclimb, and slightly below are more sites on a line leading southeast back towards the trail. There are also sites along the cliff to the north, as long as you do not go any further than the trail shown on the northern end; you then enter the wilderness area. |
| Advantages: | Fantastic views for students. |
| Disadvantages: | Winter use only; the area is crowded in summer. Have to carry water to all sites from the spring marked on the map. If you are using sites on the very southern end of Shortoff, it is difficult to check cairns without almost walking into the sites. The area is exposed and dangerous during thunderstorms. |



## STACKROCK CREEK SOLO SITE

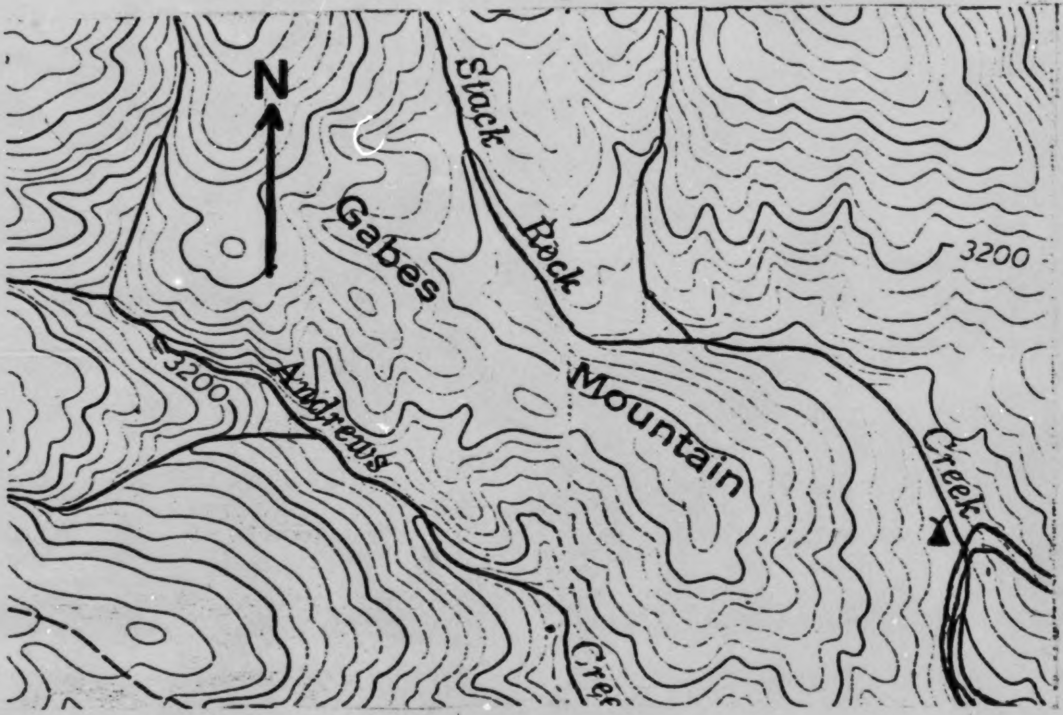
Established: Summer 1977

Quadrangle: Grandfather Mountain

Directions: Follow the directions in the DDF to Wilson's Creek solo area. Continue across Wilson's Creek from the campsite; Stackrock is the next creek of any size on your right. A logging road runs left of the creek. A watchcamp site is just off the road on the south side of the creek--not large but good enough for a tarp. A few hundred yards up there is another possible watchcamp site in some apple trees, but this one is not convenient for water. Sites extend from here on up the creek on the left and right sides of the logging trail.

Advantages: If you stagger sites carefully, students can all go to the creek for water. Most fishermen stay on Wilson's Creek, so this area is ok to use on weekends. The logging road makes cairn checks easy. It's possible to hike out here by one route from base camp on main expeditions, and have students hike an alternate route back for final.

Disadvantages: Folks may try to drive up the logging road, so it's a good idea to set up a watchcamp near Old House Gap.



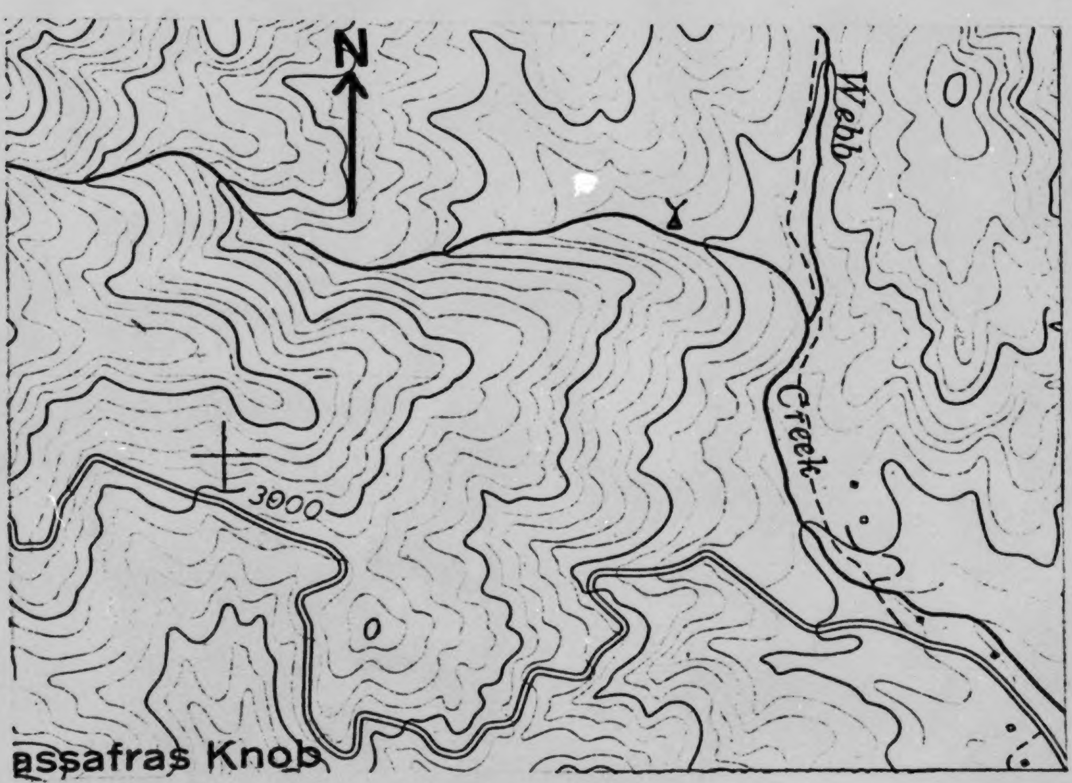
## WEBB CREEK SOLO SITE

Established: September 1979

Quadrangle: Grandfather Mountain

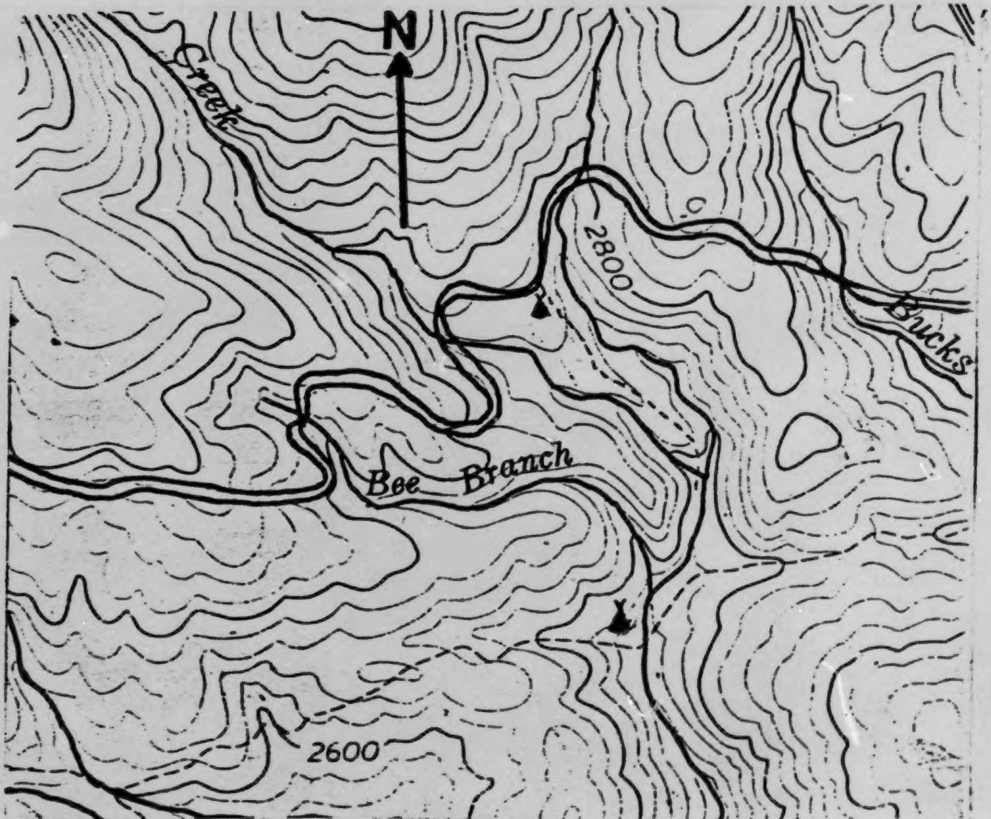
Directions: Follow the directions to Wilson's Creek solo area in the DDF, but go only about 4 miles north on the parkway from its junction with 181. Here the paved road to the left goes to Linville; take the unpaved road to the right towards Roseborough. The road descends for about 3 miles; where it flattens, look for a dirt road to the left at a new summer house. Follow this road a few hundred yards, past an old farm and some newer houses, to where it ends in a trail. Just after the trail crosses the creek, a watchcamp can be stationed where the creek and the trail both fork. Sites are up both forks of the creek.

Advantages: All sites are on the creek.
Webb Creek trail is not heavily traveled.
The watchcamp is close to a road so supplies need not be carried far.



## WILSON CREEK SOLO SITE

| | |
|---|---|
| Established: | Spring 1976 |
| Quadrangle: | Grandfather Mountain |
| Directions: | Follow the directions to Wilson's Creek solo area in the DDF. The watchcamp for this site is about 100 yards down a trail which starts behind the fisherman's camp. Sites start about 300 yards down the same trail. Some sites are downstream on the south side of Little Wilson's Creek with a cairn check possible along the trail. The remainder of the sites are on the north side of Wilson's Creek going upstream, with cairn checks at the top of the embankment above the creek. |
| Advantages: | Sites on Wilson's are excellent--large pools. Sites on Little Wilson's are ok. All sites are on the creek. Good expedition, with many variations for fast and slow crews, from here to the deerfield. |
| Disadvantages: | Beware of sites flooding in very heavy rain. Do not use this area on weekends--too many fishermen. |



## GREEN COVE

By the early 70's, increased enrollment and the limitations on the use of the newly-designated Linville Gorge Wilderness Area (see p. 80 ) made it necessary for the school to look for new areas in which to operate. Mobile base camps were used for a few years in the Pisgah and Nantahala National Forests; then a specific tract of land was located in 1974. Green Cove, near Franklin, N.C., had been willed to the Boy and Girl Scout troops of western N.C. They weren't using it full-time, so they agreed to lease it to NCOBS for 10 years (1974-1984). They still have use of the area and facilities in our absence.

Green Cove was named for Jud and Ruthie Green who lived there with their children Frank, Nelson, Ed, Jeff, Jess, Ralph, Isme, May, and Lisi in the late 19th and early 20th centuries. The foundation of their cabin may still be found about 600' down the road from the parking lot, about 5' from the west side of the road. The property passed to the Nichols family, who built the old cabin near the parking lot around 1930. Fate Garlet, a half-sister of Pid Ballew (a character well-known to many Green Cove staff) also lived in this house.

At least two other families have lived in Green Cove within the time that Pid can remember. At one time there was a cabin where the tent platform now stands on the south side of the trail to Rocks I & II. This housed various members of the Smith and Justis families. Ab and Meg Burrow with their children Ollie, Betty, Thad, and Zeb lived in a big log house in what is now the Field campsite. All these families were mainly subsistence farmers--they raised corn, vegetables, cabbages, and beans in the fields now overgrown in the cove.

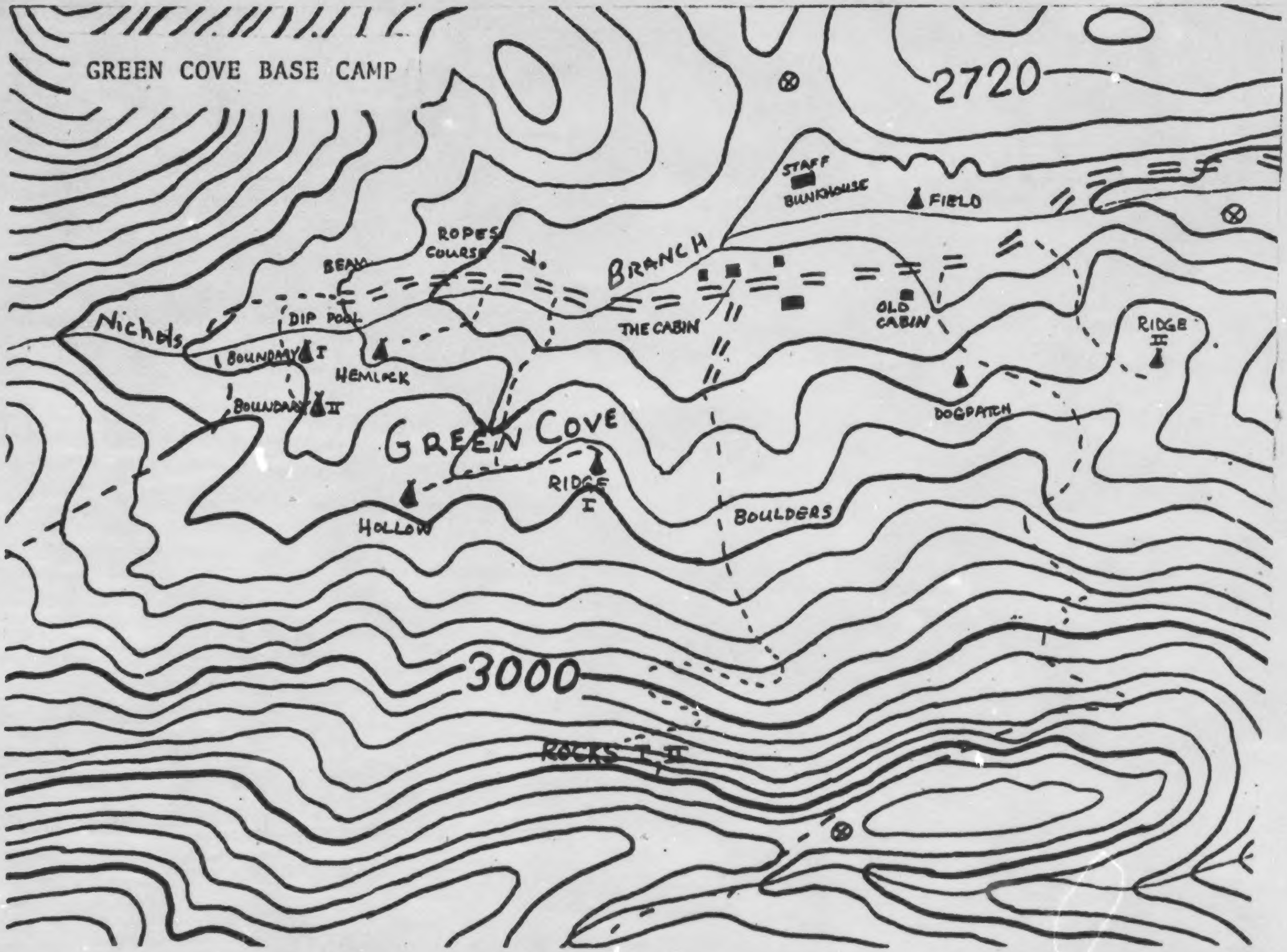
Mike Fischesser first looked over the property for NCOBS on a cold rainy afternoon in September 1974. Having determined that there were good trees for a ropes course, good rocks for climbing, and plenty of campsites, he returned in the spring of 1975 with John Logsdon, Tom Horrell, Drew Hammond, Joe Marion, and Jon (Zeke) Zeliff to build a base camp. In just four hectic months, they scouted expedition routes, tried climbing areas, found service projects, located solo sites, built the kitchen cabin and a ropes course, wrote schedules, and got all the necessary permits, papers, and permissions for a program. Green Cove was ready in June for its first six crews.

The original work group was known as the Pioneers; the first route on Whiterock was named the Pioneer Route in their honor. The next two routes were called "Dan's Decision" and "Rufus' Commitment". Dan Meyer (then school director) made the decision to start a second base camp; Rufus Dalton (then chairman of the board of trustees) had and continues to have an exceptional and inspiring commitment to NCOBS.

The climbing hut was built in the spring of 1979 by Tom Horrell, John Logsdon, Anne Gehr, Andy Turcot, and other staff. Swap-Ya volunteers built the staff cabin in the cold March of 1980.

Green Cove has proven to be a valuable asset to NCOBS, both because it has lessened our impact on the Table Rock area, and because of its own unique offerings of routes, rocks, and proximity to the Chattooga River. The Forest Service is planning to contract for timber bids in the cove in the spring of 1980; logging will probably occur the following summer and fall, and the existing road through the cove will be widened and graveled to give log trucks access to the head (south) of the cove. After some deliberation, NCOBS has decided to work with the Forest Service instead of against it in this effort, and to continue summer and fall operation out of Green Cove around the loggers. It will take some initiative and creativity for instructors to present the logging as a positive learning experience.

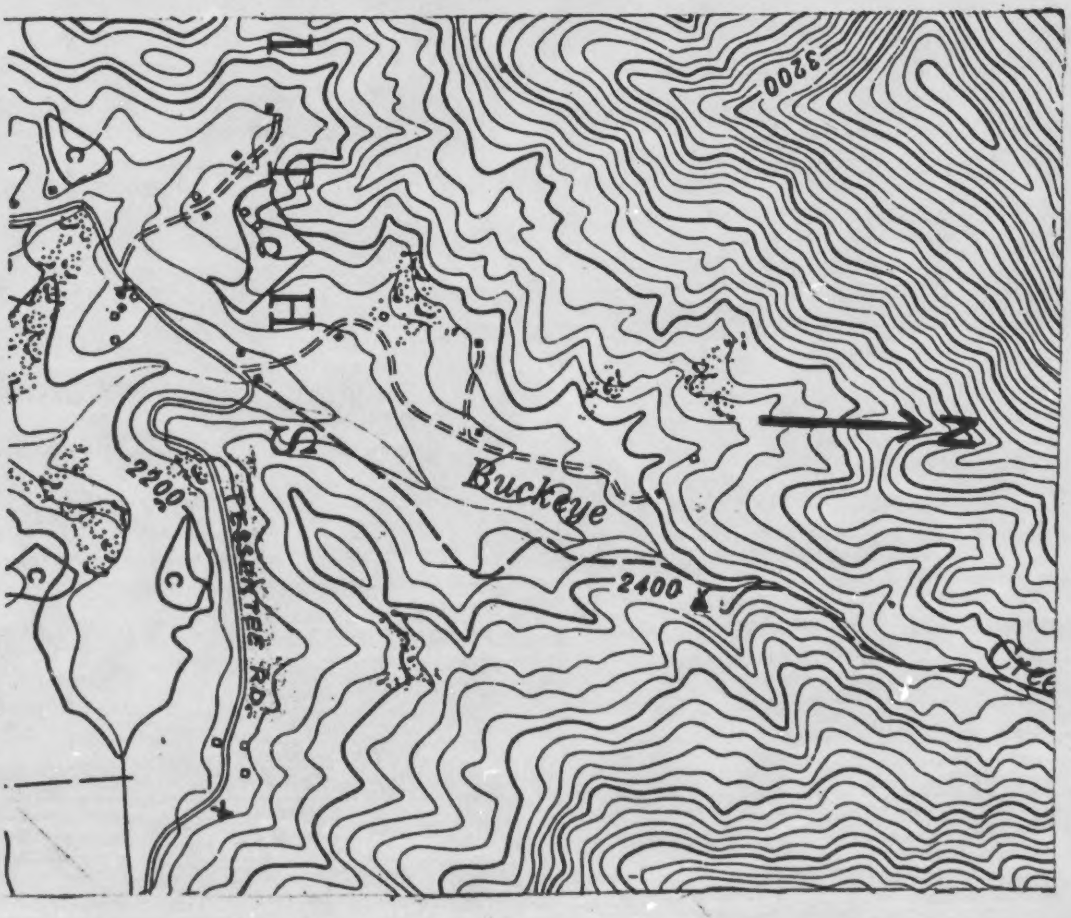
***


GREEN COVE BASE CAMP
2720
STAFF
BUNKHOUSE
FIELD
ROPES
COURSE
BEAM
BRANCH
Nichols
DIP POOL
BOUNDARY I
BOUNDARY II
HEMLOCK
THE CABIN
OLD
CABIN
RIDGE
II
DOGPATCH
GREEN COVE
RIDGE
I
HOLLOW
BOULDERS
3000
ROCKS I, II

Best Copy Available

## BUCKEYE CREEK SOLO SITE

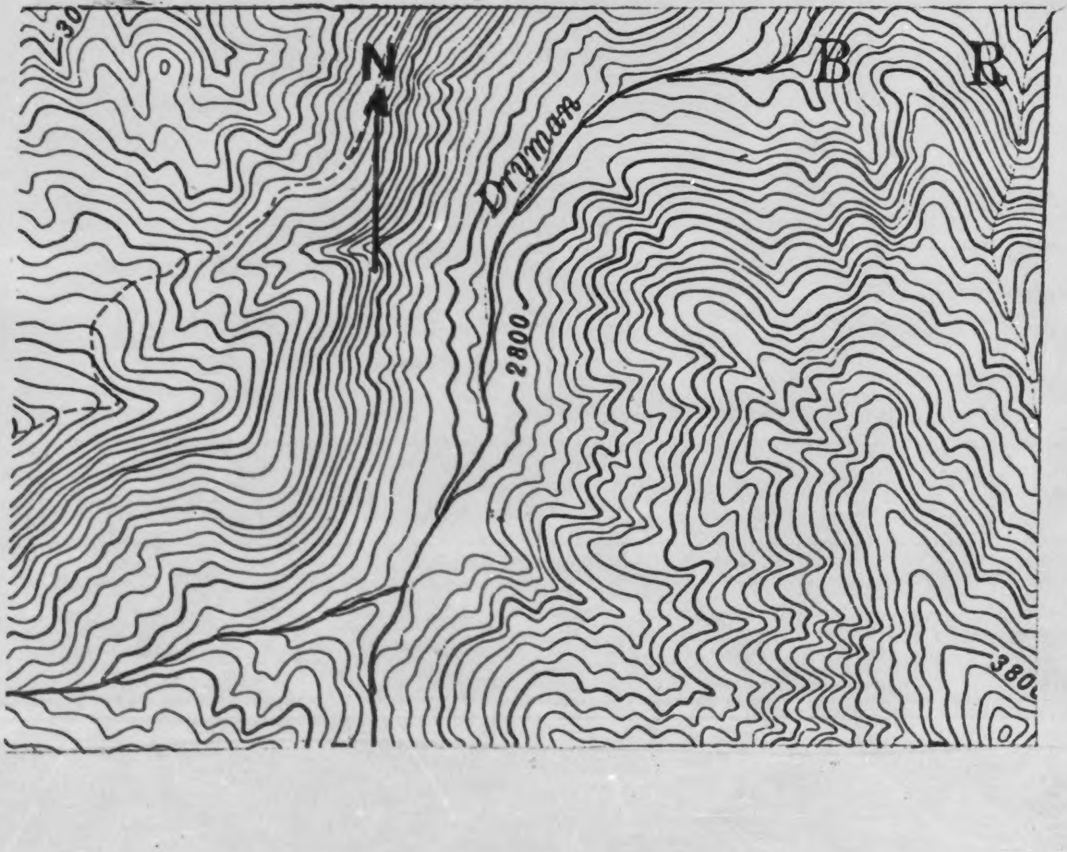
Established: Summer 1977
Quadrangle: Scaly Mountain
Directions: Approximately 2.5 miles south of Otto on 23/441 there is a hair pin turn where a dirt road takes off on the right. A gate across the road belongs to Captain Chester Flancher. Continue up past the gate on the jeep trail until you come to a foot trail running along the creek. A flat area here below the sites can be used for a watch camp. After a short steep climb, the area flattens out for the sites.
Advantages: All sites are on the creek. Close to basecamp. Few other users.



Best Copy Available

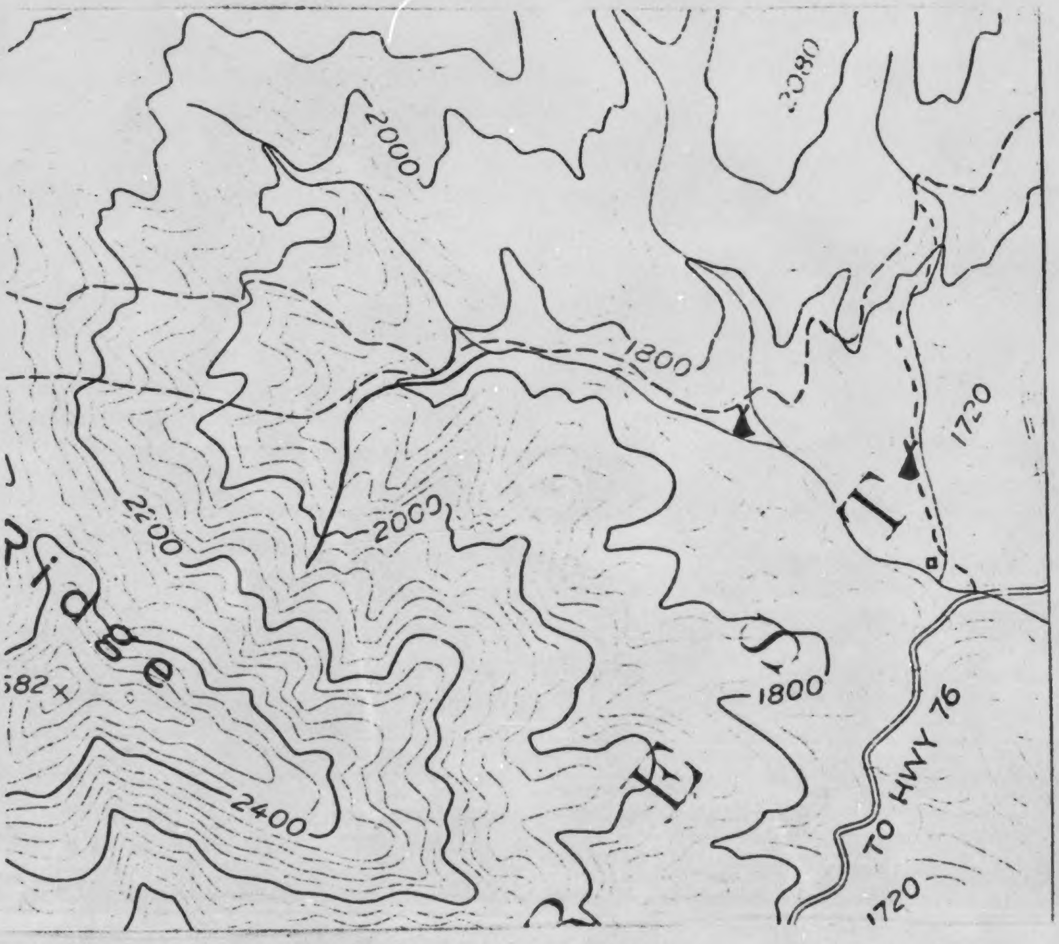
## DRYMAN'S FORK SOLO SITE

Established: 1978
Quadrangle: Prentiss
Directions: Follow the road to Pickens Nose until you come to the Reynolds Gap. Use the Coweeta Hydrologic Laboratory Map to find the road from Reynold's Gap to Dryman's Fork. 4.5 miles from the gap, the road ends at the fork. There at the road end is a good watchcamp. A log bridge across the creek just upstream from the watchcamp leads to a trail which follows the creek downstream and can be used for cairn checks. Downstream there are 8-9 well-spaced sites. A trail upstream of the watchcamp leads to 2 more excellent sites. Possibly there are more sites further upstream and on the tributary downstream from the watchcamp.
Advantages: Undisturbed by road noises or fishermen. Lots of room for sites.
Disadvantages: Lots of poison ivy. Use only on weekdays. Sometimes folks from the laboratory are in the area to take water samples or to work on the road or bridges. Check their schedule before using the area.



## LICK LOG BRANCH SOLO SITE

Established: Summer 1979
Quadrangle: Rainy Mountain.
Directions: Follow the directions in the DDF towards the 76 bridge. About 5.5 miles south of Clayton, turn left off 76 onto a dirt road, just past the Chechero Church on the left. After about 2.5 miles, this road crosses Lick Log Branch; just past the bridge is a turn-in at an old road on the left. Walk up this road less than 0.5 mile to a trail; a left on this trail will take you back to a fork in the left fork of the branch. A watchcamp can be set up at the fork; sites are on trails up the left branch and elsewhere as shown on the map.
Advantages: All sites are on the creek.



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# LLOYD COVE SOLO SITE

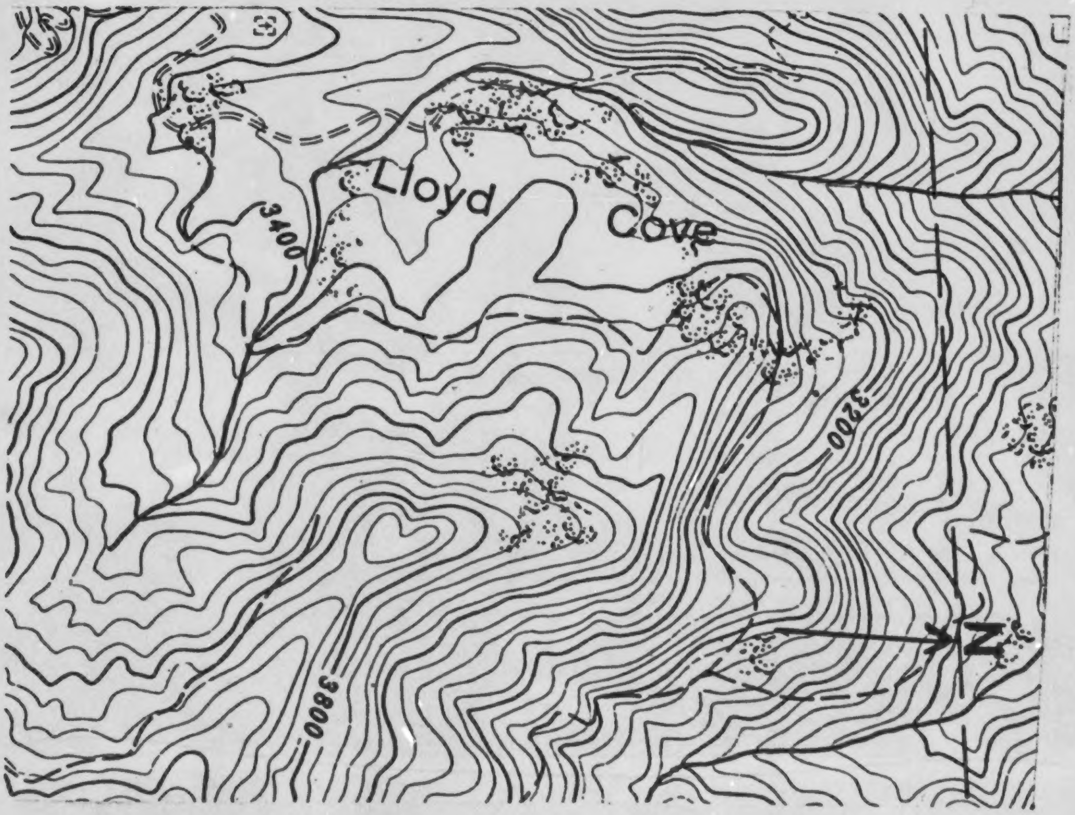
Established: Spring, 1975

Quadrangle: Scaly Mountain

Directions: Lloyd Cove is the area to the east of Green Cove; permissions to use it has been given by Henry Dillard. An old logging road goes behind the fields on the south and east sides; there are about 8 sites along this road. Others are out along the marathon route where it comes up into Lloyd Cove from the Tessentee Creek valley.

Advantages: Re-supplies can be made from the orienteering station on the ridge between Lloyd and Green Cove. Some students have a bit of pasture to sit in at the edge of their sites. There are four pastures inthe cove.

Disadvantages: A cabin was built in one of the larger pastures during the summer of 1976, so we can only use this area if the cabin is not in use. Too crowded for three-day solos; ok only for mini-solos as on short courses. Continued development may eventually curtail our use of this site.



# PERRY CREEK SOLO SITE

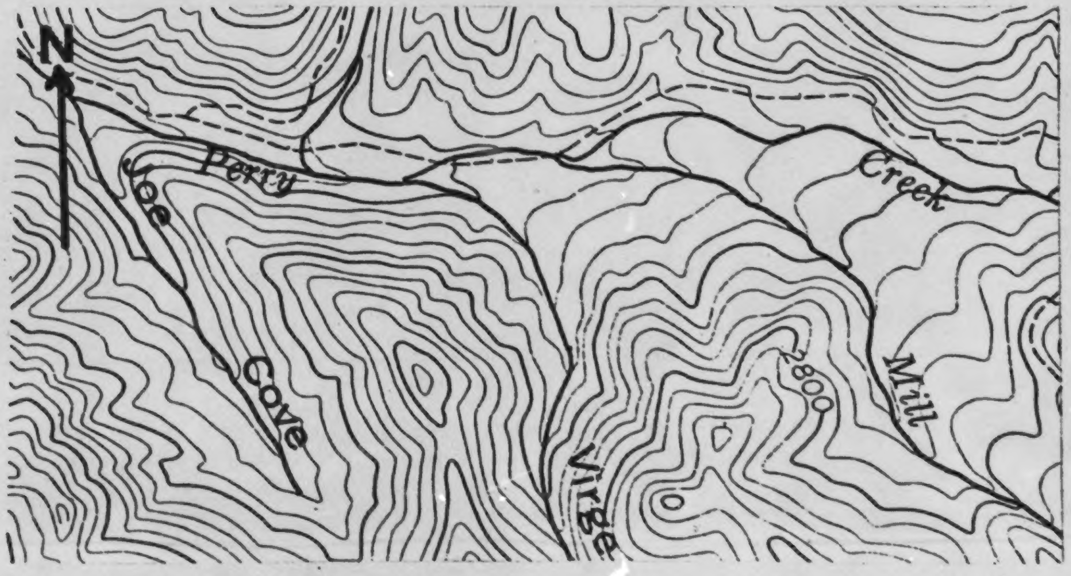
Established: Spring 1975

Quadrangle: Shooting Creek

Directions: Follow the directions in the DDF to Perry Creek. There are enough solo sites in this 5-creek watershed for 2 or 3 crews. The road has been recently graded and is a little different from the map, but easy to follow. Sites begin way up in the flat, white pine area.

Advantages: Fred Lewis and Dealy Wood live further on down the gravel road. They have phones and are very hospitable. Dealy is a class in mountain culture herself. Have your crew meet her if possible. Possible service projects in this area: Dealy Wood, Bellva Mull. All sites are on the creek. There may be more good sites on Bluff Branch NW of here.

Disadvantages: There used to be a pretty wild-looking motorcycle camp up the trail to the left of Perry Creek--avoid this area. All sites and the watchcamp must be off the logging roads and well-hidden (leave re-supply people a cairn with directions to your camp). Crews going on final from here will encounter steep areas near Perry Gap. Tell them not to try out their climbing skills. Steep banks of Passmore Branch may be eroded by students climbing up and down to build cairns. Try to place students so as to minimize this.



# POUNDING MILL CREEK SOLO SITE

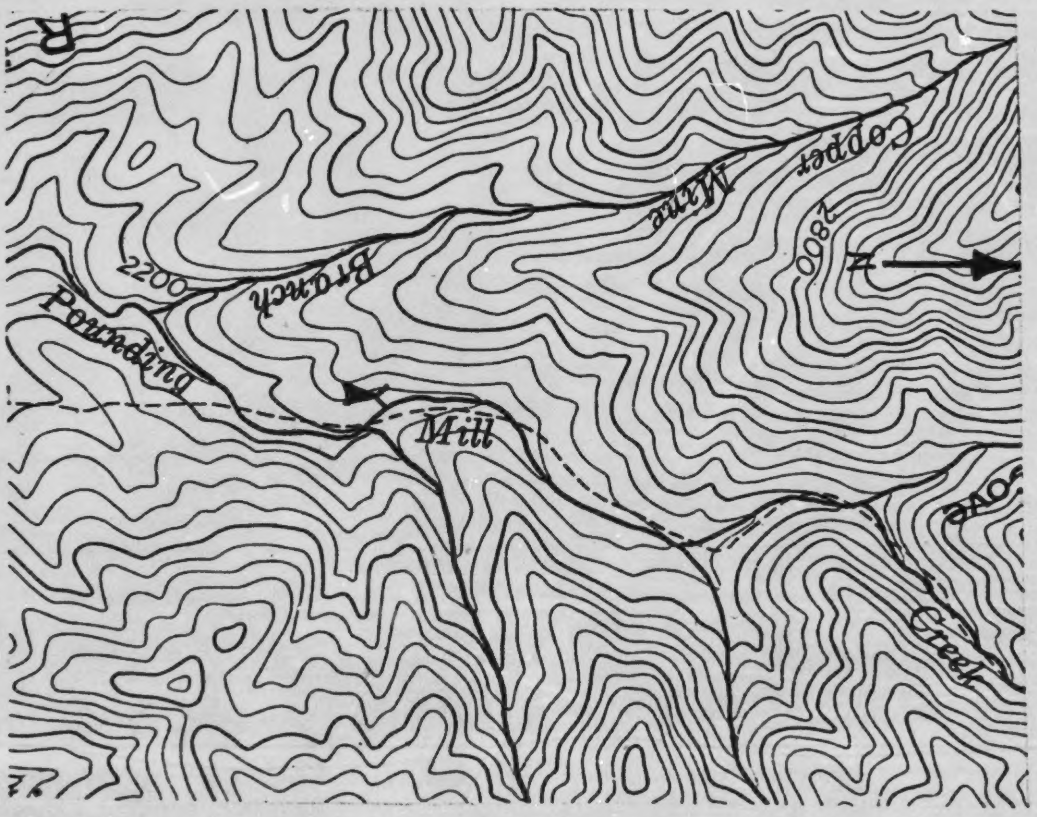
Established: Spring 1975

Quadrangle: Shooting Creek

Directions: Follow the directions in the DDF to Pounding Mill Creek. Walk or drive further on the dirt road to a creek-crossing within 1/2 mile . This is sometimes used as a watchcamp. Sites are further up both Pounding Mill Creek and Dark Fork.

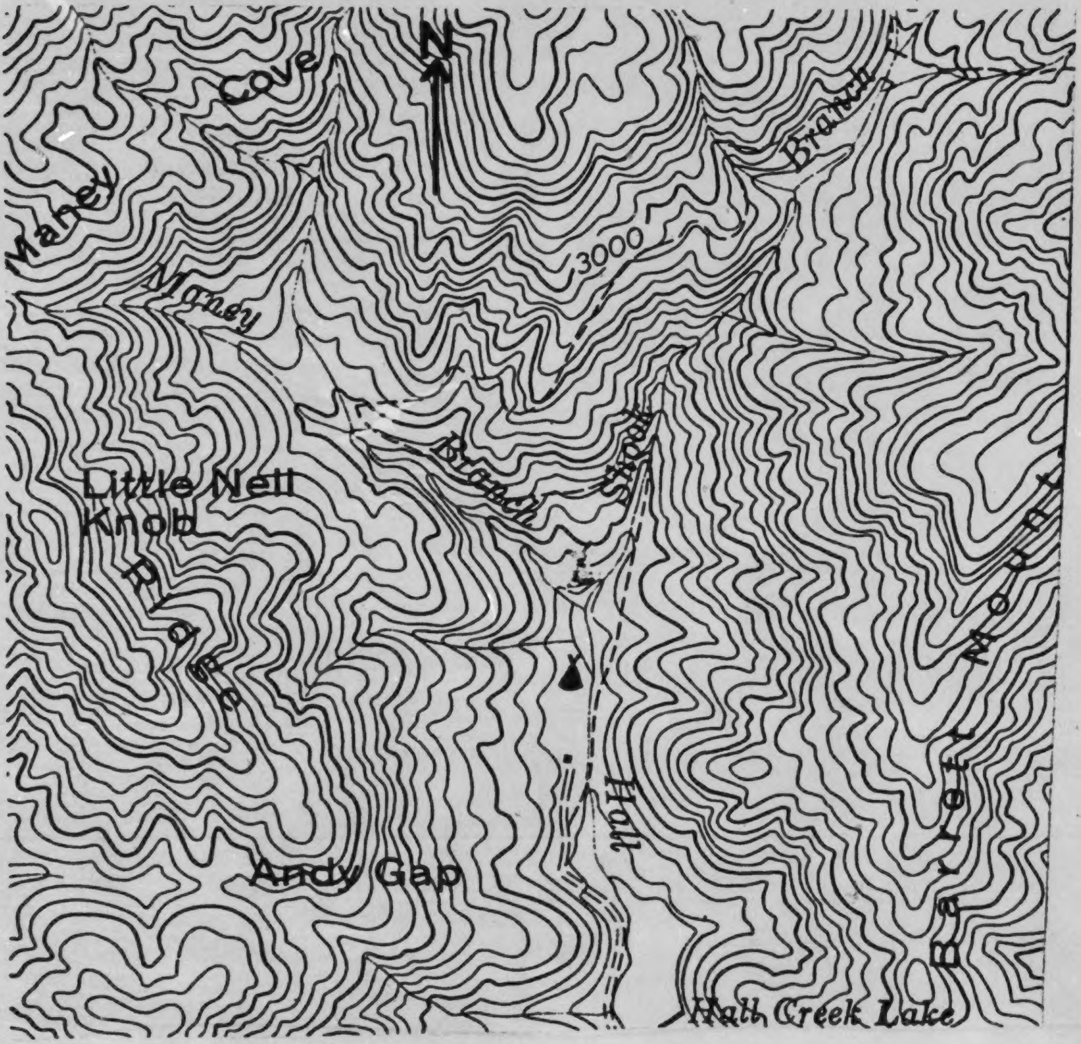
Advantages: Anderson's Amoco is a nearby source of junk food and other forbidden pleasures for instructors. Houses on #1338 can be used for emergency phones. All sites are on the creek.

Disadvantages: If students are put out along the creek before the fork of Dark Cove, take care that they are not in a position to see anyone coming in on the dirt road. Originally there was some logging in Dark Cove, so the sites with the most solitude will be up the main fork of Pounding Mill Creek. Dogs are a hassle when running out of this watchcamp.



## SHOOK CREEK SOLO SITE

Established: Spring 1975
Quadrangle: Macedonia
Directions: Follow the directions in the DDF to Shook Creek solo area. Walk up the main dirt road to a metal gate 50 yards from the parking area. A watchcamp can be set up in the field further up the trail behind the gate. Sites are in three areas: along Shook Creek below the steep falls, along Maney Branch, and below the watchcamp at the edges of the fields. Watch out for snakes.


N
Maney Cove
Branch
3000
Maney
Branch
Shook
Little Nell Knob
Ridge
Hall
Andy Gap
Barrett Mount
Hall Creek Lake

# TESSENTEE CREEK SOLO SITE

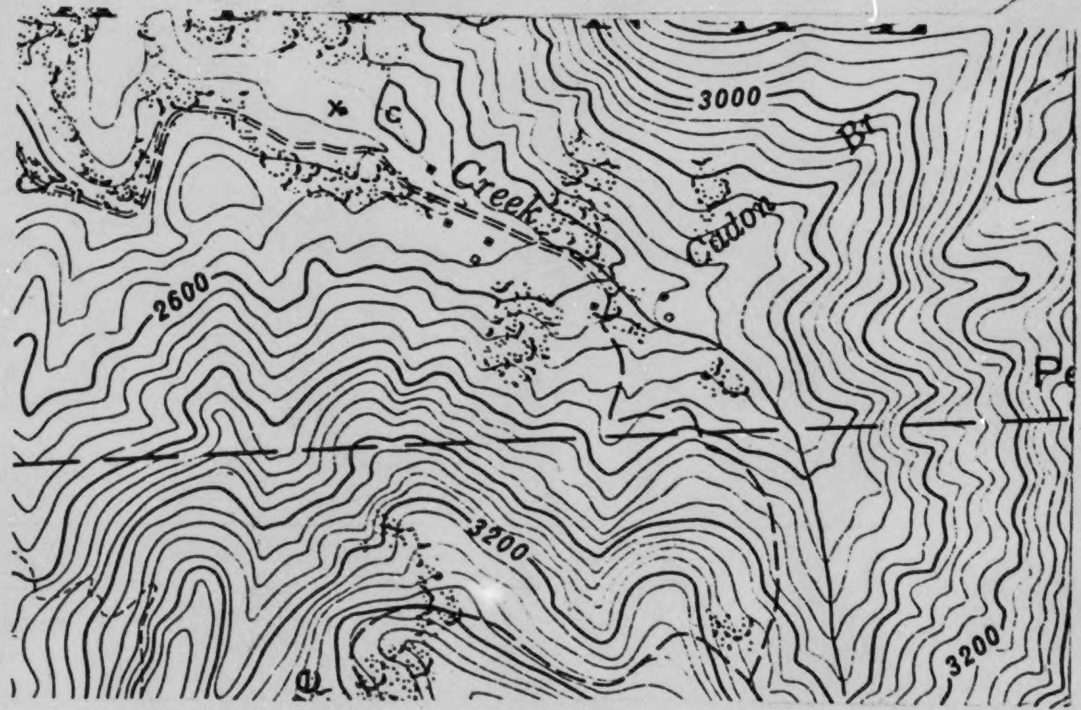
Established: Spring 1975

Quadrangle: Scaly Mountain

Directions: These sites are up at the end of the road past Green Cove, behind the Feneis's house, along a trail out of the back right corner of their yard. The sites are along the creek side of the logging road and up tributaries. A watchcamp can be below all the sites or in the middle. Call the Feneis's for permission before using the area.

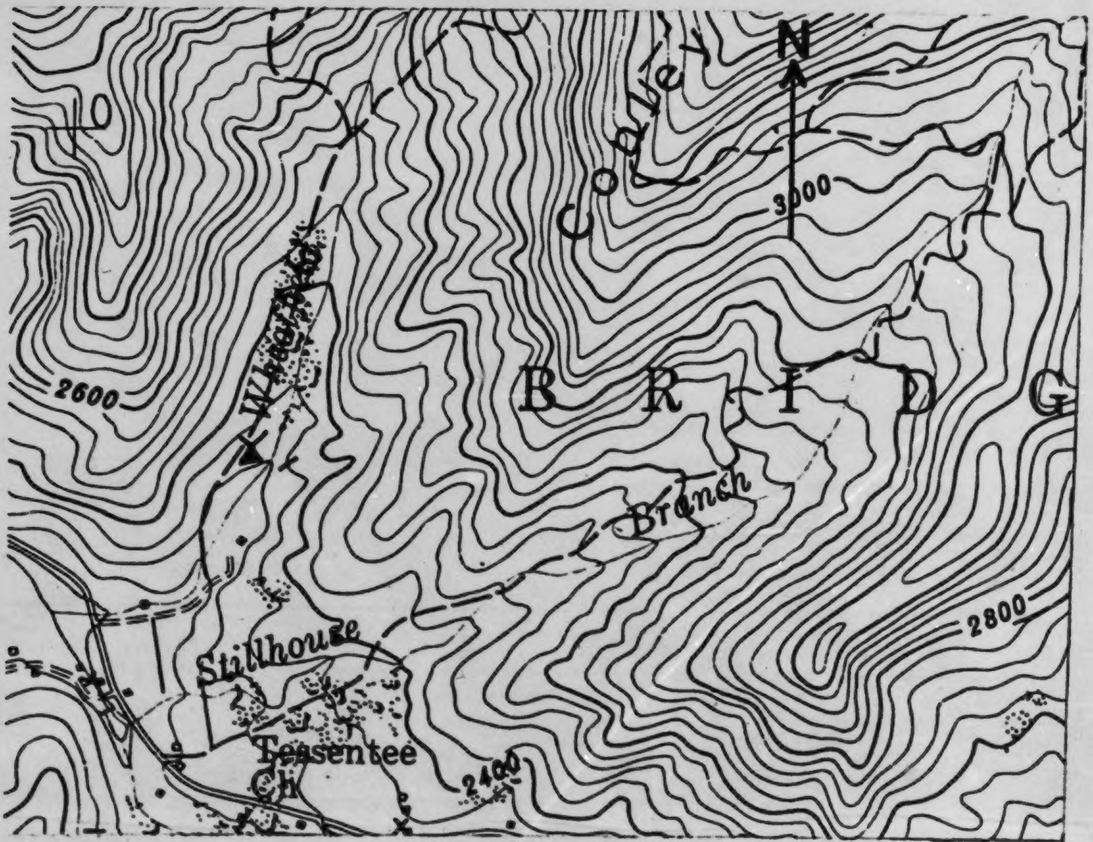
Advantages: Easily accessible without trucking from base camp. All sites are on the creek.

Disadvantages: Curious students wander down to the Feneis's house. Some crews have been blindfolded and marched by the house without ever seeing it. Others have come in from an old road out of Lloyd Cove; still others have come in from the top of the watershed. An unfriendly German shepherd lives at Feneis's house--it bit an instructor in 1979. Sites are close together and cramped. Use this area only in a pinch.



# WHEATFIELD SOLO SITE

| | |
|---|---|
| Established: | Summer 1978 |
| Quadrangle: | Scaly Mountain |
| Directions: | Approximately 1.5 miles south of Otto on 23/441 is a mailbox on the right side of the road, which is the Pattersons'. They are very friendly, but it's a good idea to let them know you're coming in advance. Take the dirt road that goes by their house on the left. Where the road continues to bear right at the edge of the woods, take an old logging road left through an old cornfield; follow it 0.5 mile to a flat area on the left next to the creek; here is a good watchcamp. Sites are along the creek. The area gets very steep about a mile up, but there are more sites further up the left fork. |
| Advantages: | There is an old logging road running by the creek which can be used for cairn checks. All sites are on the creek. |



## RIVER PROGRAM

From 1966 to 1975, NCOBS used a variety of different rivers for tubing, canoeing, and rafting. Wilson's Creek and the Linville, Nolichucky, Little Tennessee, and Nantahala Rivers were all used at one time or another. Since 1975, we have offered primarily three days of whitewater canoeing on either the Chattooga or the Toe River.

### Toe River

The North Toe River flows out of the hills east of Roan Mountain, joins the South Toe coming out of the valley east of Mt. Mitchell, and joins the Cane River several miles west to form the Nolichucky. The Nolichucky, via the Tennessee, Ohio, and Mississippi Rivers, eventually drains into the Gulf of Mexico. Thus the Toe River flows through the higher mountains in the east to reach its destination. Such a paradox is possible because the river is older than the mountains; it helped to carve them out of the high plateau they once were (see p. 67 for more on this phenomenon).

Its name is a contraction of Estatoe, the name of an Indian chief's daughter who fell in love with a rival tribesman. While they were eloping in his canoe, he was shot and killed by her irate brothers. She drowned herself in sorrow in this river.

Mining in the area was begun about 450 years ago. These ancient miners were driven out within a few years by transient bands of Cherokees, and mining did not resume until 1867 (see p. 71 for more history of the Toe River area). Today, silt from mica, feldspar, and kaolin mining colors the river gray.

Most of the land around the Toe is private farmland. NCOBS has permission to use a private campsite at Mile 17. Crews are driven there after each day on the river; directions are in the Driver's Direction File. If you run with your crew out of this campsite, please have everyone wear sweatpants; the local folks are offended by shorts. The first day's paddle is from Red Hill Bridge to Relief, about 7.2 miles. The second days' run is on the more challenging upper section of the North Toe, from Boonford to Red Hill Bridge (11.5 miles) or just to Mile 17 (approximately 7.5 miles) if a shorter day is needed.

## Chattooga River

The Chattooga is part of the nation's Wild and Scenic Rivers System, created by an act of Congress in 1968. Roads cannot come within 1/4 mile of it, and camping is allowed anywhere along its wild banks, as long as the camp is at least 50 feet from the river or its tributaries or a trail (trails include old roads no longer used by vehicles) and 1/4 mile from any road. The difficulty of the rapids increases as you travel further down the river, so NCOBS crews can do a 2-3 day trip which becomes progressively more difficult, camping along the river. For us, the Chattooga is about ideal.

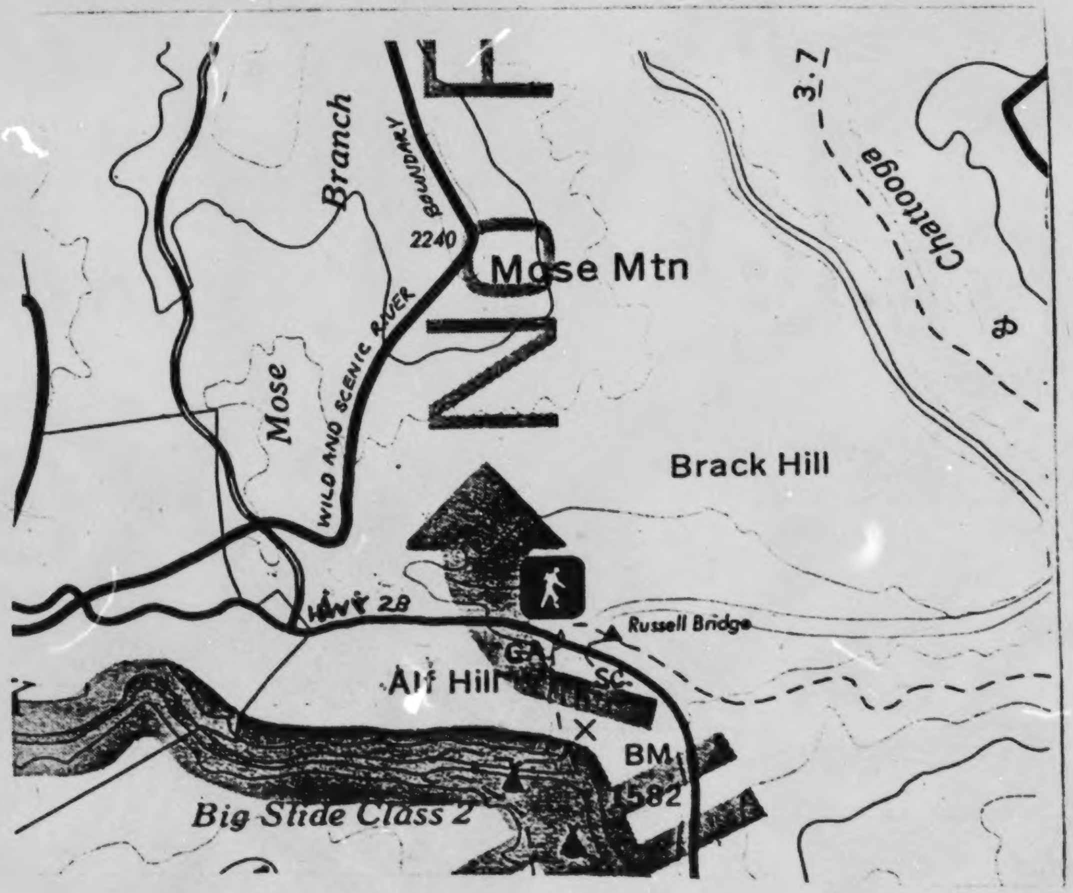
The movie Deliverance was filmed here, and the river has never quite recovered. Although the film catapulted the river into the national spotlight suffiently to have it classified as wild and scenic, it also drew thousands of green-horn river runners, who have been drowning, camping, and causing problems ever since. Several tour companies run raft trips, and it is a rare day that an OB crew has the river to itself. Local folks tend to dislike the tour companies (including NOC) because they think the tour companies are primarily responsible for the wild and scenic classification, which has crowded the area in general and prevented the locals from driving to their favorite fishing and swimming spots as they once could. To add to this mélée, NCOBS sends 700 people a year down the Chattooga, and they all camp in the same several spots.

Thus, our impact alone is considerable, and if we are to continue to have the privilege of using the Chattooga River, we must minimize our impact on it. The following campsite guide will help you to locate most of the campsites along the river. As some of these begin to shown signs of wear, we may discontinue use of them and designate others. Course directors may set up campsite rotations to prevent overuse and overcrowding when there are two or three crews on the river; check with your CD to find out whether there are any particular sites you should use or avoid.

## RUSSELL BRIDGE CAMPSITE

### (Beginning of Section II)

Follow the directions in the Driver's Direction File to Russell Bridge Parking area. Cross Route 28, staying on the Georgia side of the river. Follow the Bartram Trail, marked with yellow blazes, above the river until you reach a ford across the West Fork. On the far side is an old road; the first campsite is about 100 yards beyond the ford; others are further on. Be sure your campsite is at least 50 feet from this old road. Crews that arrive early should proceed down the road to allow Table Rock crews, who generally arrive very late, to camp without disturbing the earlier crews. The water in the Chattooga and the West Fork are safe to drink if purified.


Branch
BOUNDARY
2240
Mose Mtn
3.7
Chattooga
Mose
WILD AND SCENIC RIVER
Brack Hill
HWY 28
Russell Bridge
GA
SC
Alf Hill
BM
1582
Big Slide Class 2

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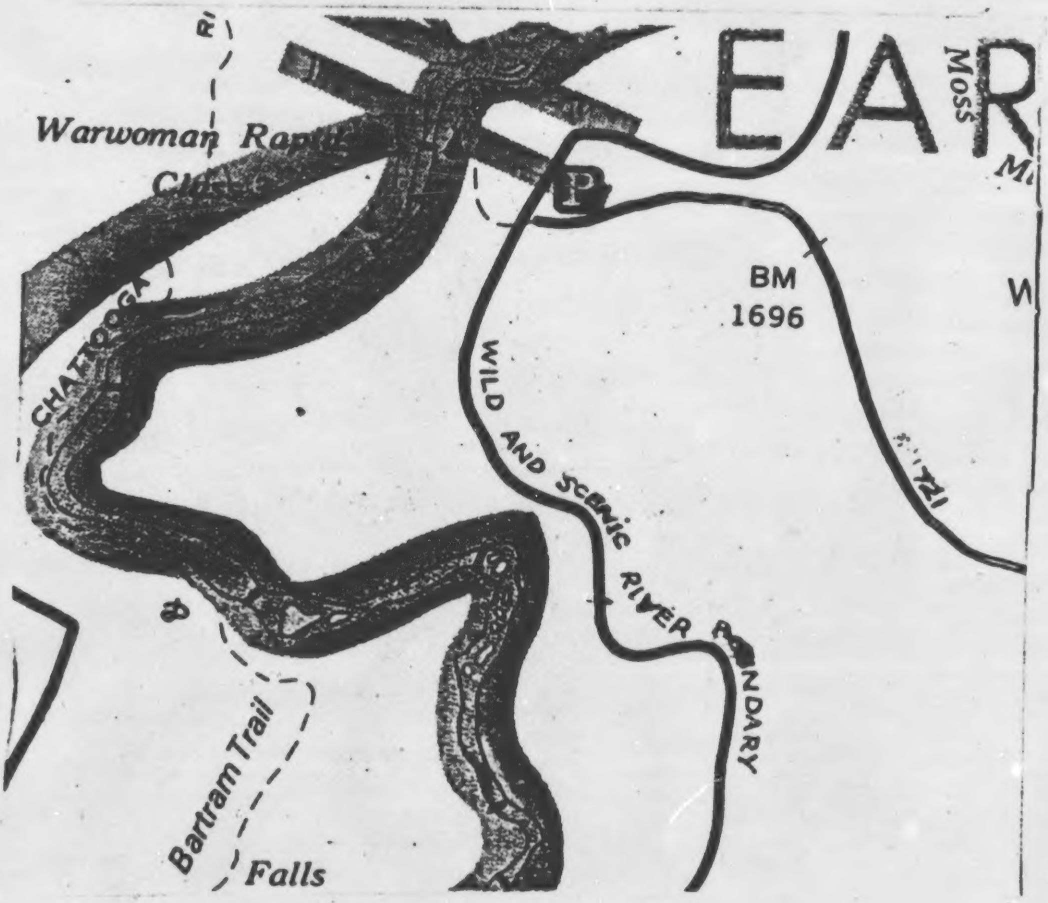
## EARL'S FORD CAMPSITE

(Beginning of Section III)

On the S.C. side there is a campsite just above the river where you take out, about 100 yards from the ford. Make sure your camp is at least 50 feet from the river. Another campsite is across the river (Georgia side) at a point several hundred yards below where Warwoman Creek enters the river (there is another site upriver nearer the creek at the end of a road; don't use it; it's illegal and overused). Ferry equipment across in the calm water above a small rapid there (Warwoman Drop); then hike downriver to the campsite. The drop is difficult to negotiate with gear. (Note: a family of beaver inhabits the calm water above the drop and can usually be seen at dawn and dusk. See p. 91 for more about beaver.)


Warwoman Rapid
EAR
Moss
P
BM
1696
CHATTOOGA
WILD AND SCENIC RIVER BOUNDARY
Bartram Trail
Falls

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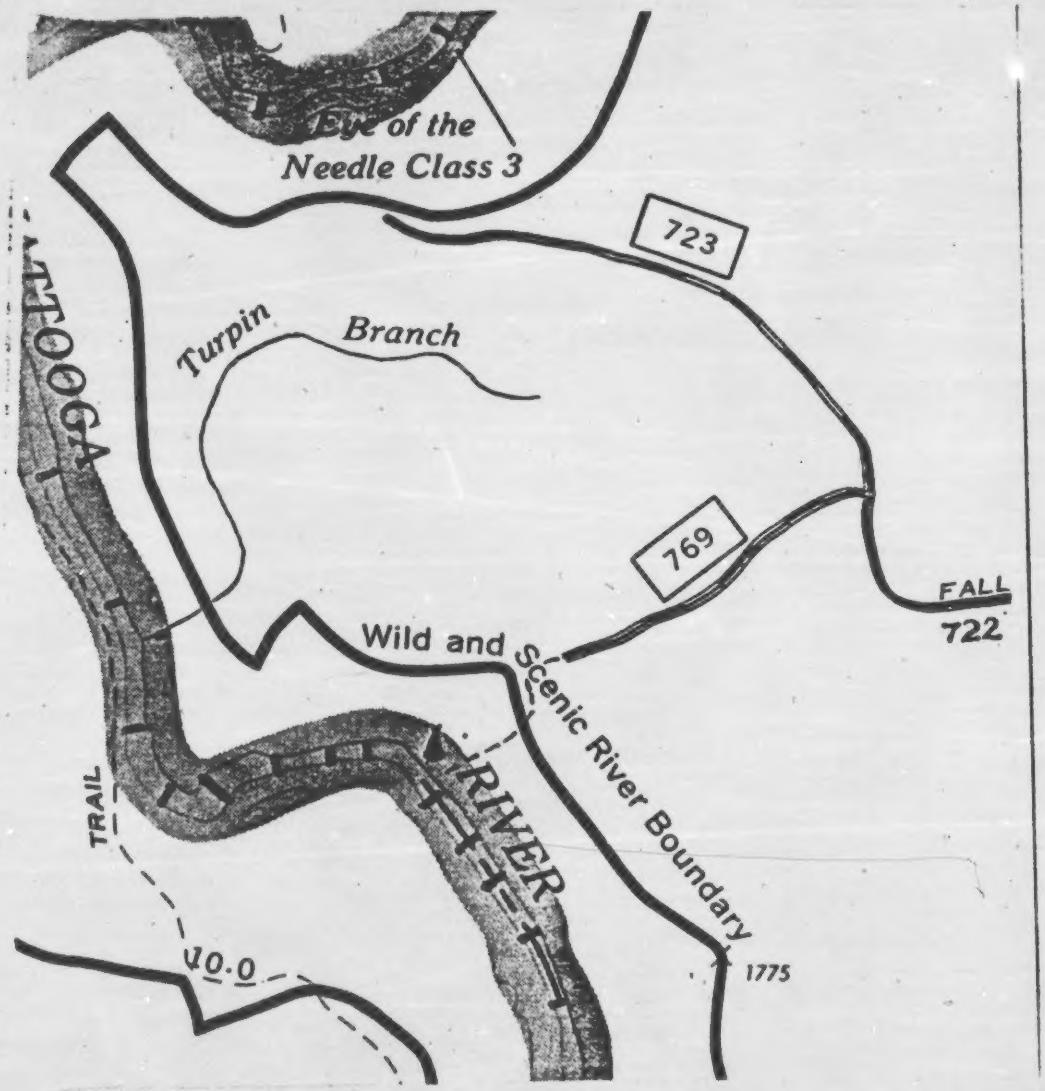
## FALL CREEK CAMPSITE

### (Section III)

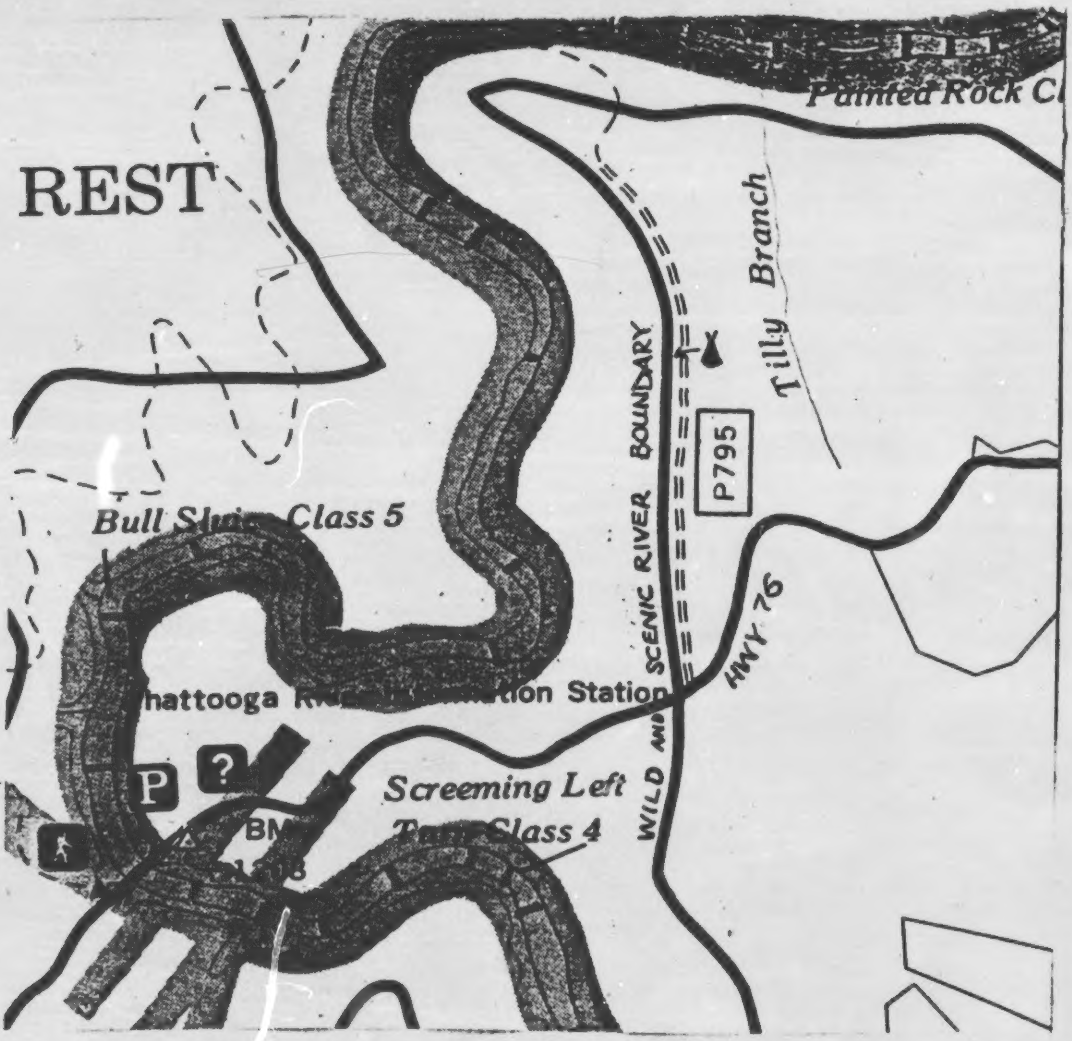
The take-out is at the bottom of Fall Creek Trail. There is a steep walk about 1/4 mile to where the trail meets a good gravel access road. This area receives little use by the public, the road has little vehicle traffic and is good for running, and the blueberries in August are great. New campsites for this area will be determined for the 1980 season and beyond.


Eye of the
Needle Class 3
723
TOOGA
Turpin Branch
769
FALL
722
Wild and Scenic River Boundary
RIVER
TRAIL
10.0
1775

## ROGUE'S FERRY (THRIFT'S FERRY)

### (lower Section III)

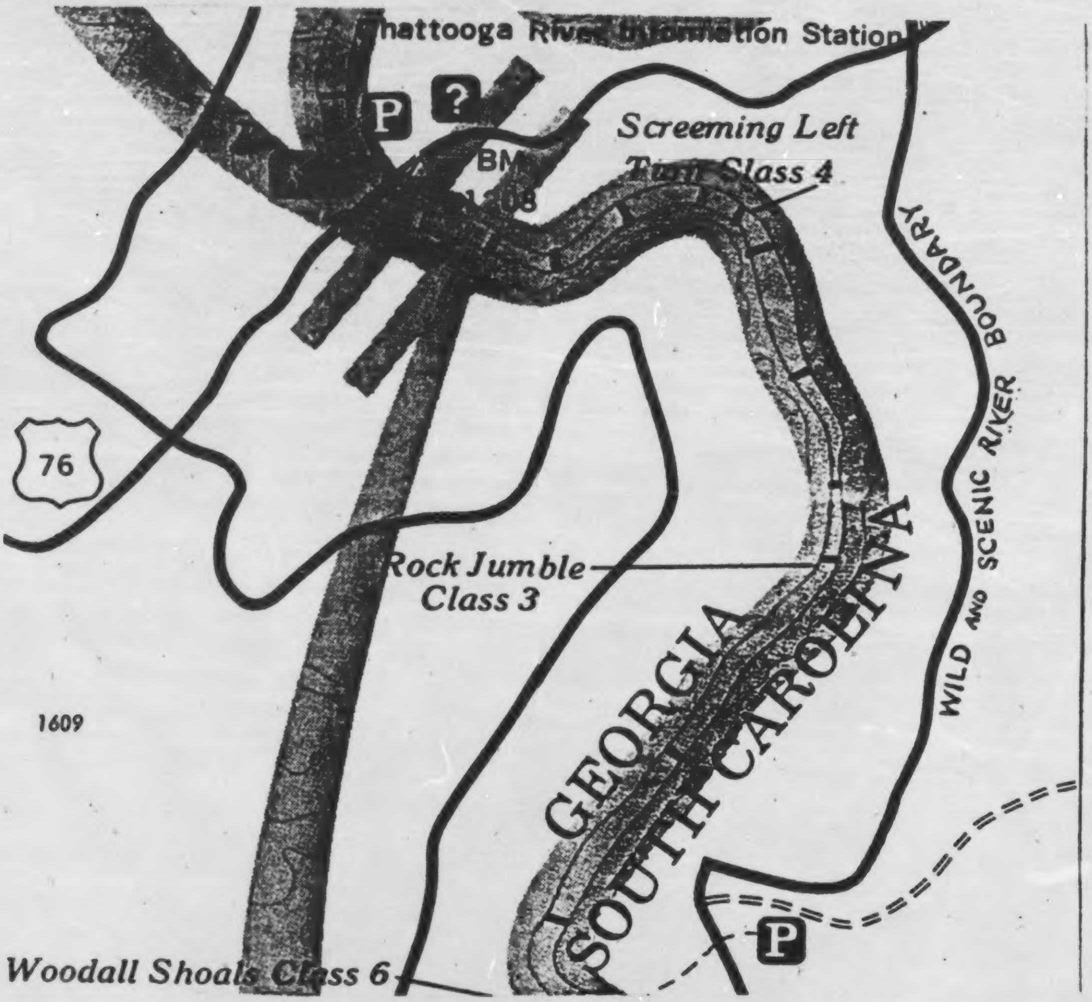
River access to this site is just above Keyhole Rapid on the S.C. side of the river. Walk up the steep old dirt road until it flattens out and a road branches off to the right; this is just before the road meets Highway 76. There are several campsites back along this road. Vehicle access is easy from Highway 76, making this a good first or last night campsite for rafting crews on the lower river. This is a "designated campsite" outside the scenic river corridor, so it is not necessary to move 1/4 mile back from the road to camp.


Painted Rock C
REST
Tilly Branch
WILD AND SCENIC RIVER BOUNDARY
P795
HWY 76
Bull Sluice Class 5
hattooga River Station
P
?
Screeming Left Turn Class 4
BM

## HIGHWAY 76 BRIDGE

(end of Section III)

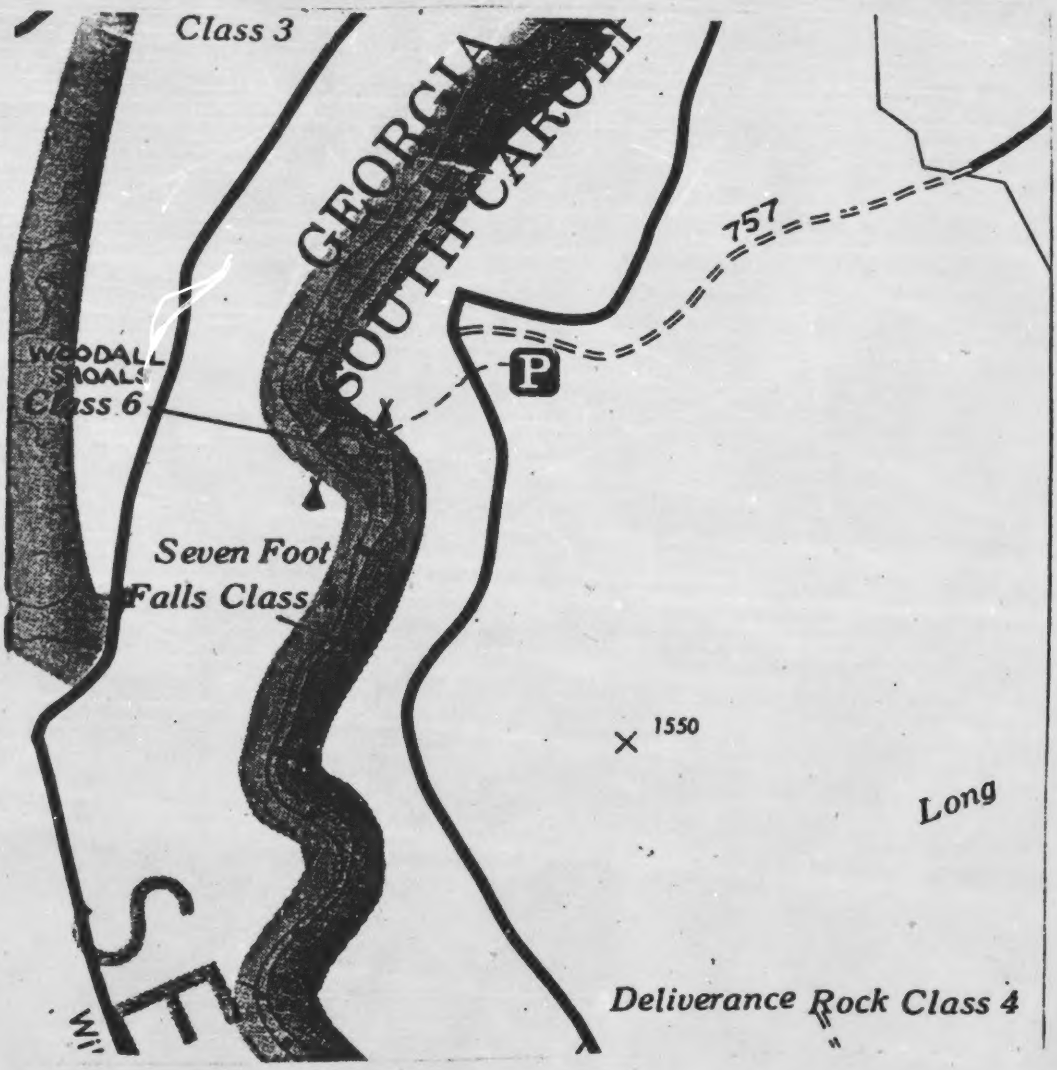
There is an old logging roadbed high above the river on the Georgia side which can be used for camping. Follow the obvious old dirt road north out of the old parking lot; be sure to go at least 1/4 mile from Hwy. 76, and then find a campsite at least 50' off the roadbed. Drinking water must be carried in.


hattooga River Information Station
P
?
BM
1208
Screeming Left
Turn Class 4
BOUNDARY
WILD AND SCENIC RIVER
76
Rock Jumble
Class 3
GEORGIA
SOUTH CAROLINA
1609
P
Woodall Shoals Class 6

## WOODALL SHOALS

(Section IV)

On the Georgia side, there is a campsite just inside the edge of the woods west of the large pool at the bottom of the rapids. Gear must be ferried across; there is vehicle access on the other side. On the S.C. side, there is a large sandy camp at the bottom of the access trail from the road. Anther site is down an old road (with a gate across it) past the vehicle parking lot. The S.C. side is another "designated campsite", so it is again unnecessary to move back a full 1/4 mile from the road.


Class 3
GEORGIA
SOUTH CAROLI
757
P
WOODALL SHOALS
Class 6
Seven Foot
Falls Class
1550
Long
Deliverance Rock Class 4

## WORLEY'S CAVE

This is a very large and well-known cave (also known as Morrill's Cave) which opens in a huge sink (3-4 acres) near Johnson City, Tennessee. Until the early 60's, it was the longest known cave in east Tennessee (since then, Cuyler Cave, with a length of 6-7 miles, has usurped that distinction). The cave is an excellent example of the Appalachian cave pattern, in which floors and ceilings are inclined with the dip, and passages follow the strike (see "Cave Formation", p.68). The two levels follow the strike with only minor deviations; the lower or stream passage has developed down dip from the upper passage.

The cave received its name from John Morrill, a local resident, who led many cave explorations near the turn of the century. The more common "Worley's Cave" name comes from E.S. Worley, whose signature and the date (1882) appear on a rock in the Giant's Causeway.

The above information and the accompanying map are taken from Barr's Caves of Tennessee. The complex system in the back of the cave wasn't discovered until after Barr's book came out; that part of the map was drawn from memory by Don Haldiman and Mike Fischesser. This back area is probably the true "Virgin Passage" rather than the main side passage nearer the entrance which is commonly called the Virgin Passage.

### NCOBS Use of the Cave

In 1971, Keith Evans secured permission from Mrs. Haskall Lowry, the owner, for NCOBS staff to enter Worley's Cave. Don Haldiman, Charlie Jones, and John Logsdon did a re-con with Cato Holler (Flittermouse Grotto-Marion, N.C.). In January, 1973, Peter Bryant and Arlene Ustin took the first crew into the cave for three days, with John and Mike Fischesser assisting. That summer, John Logsdon used the cave for a 3-day training expedition and Mike used it for a 3-day accompanied final expedition.

In the spring of 1974, NCOBS was informed that the cave had been closed and no one would be given permission to enter. Several re-cons turned up no other cave nearly as suitable, and finally in late 1975 it was decided that the school must try to persuade Mrs. Lowry to grant permission to return to Worley's.

After a conversation with George Sweazey, Mrs. Lowry agreed to let crews use the cave, if a release was signed and she was informed before each visit. 3 crews used Worley's in January of 1976 and 2 more were there in January of 1977. Mrs. Lowry died in 1977 and her husband granted permission in 1978, but he said that the state may buy the property. This may mean restrictions on use in the future.

## Public Relations and Parking

Directions to Worley's Cave are in the Driver's Direction File. The people who live around the entrance don't own the cave, but you do have to cross their property to get to it. The Peters family lives in the white house beside the road; ask permission to go through their gate. Often, they aren't home or don't answer. In that case, leave a letter in a sealed envelope at their door (see the sample letter below).

## Sample Letter to Leave at the White House

Dear ------

The van left in front of your house belongs to the North Carolina Outward Bound School; we've left it there while we explore the cave with our students. It will be there until ________ . Please call the sheriff if you see anyone trying to get into it before then.

We have permission from Mr. Lowry to enter the cave. The folks at our base camp know when we are to return and will come after us if we're late, so please don't worry if we are not out exactly on time.

We'll try to be quiet as we pass your house, and we'll make sure to fasten any gates we pass through.

Thanks a lot,

NCOBS

### Some guidelines

- Pull the van off the left side of the road beside the fence just beyond the Peters' house. Get as close to the fence as possible. The van should be headed the wrong way on the wrong side of the road.
- Other people have reported break-ins with their vehicle so keep the key, don't leave valuables, and cover up any gear left behind.
- Act very civilized until you are out of sight and earshot of the road and the house. Do not change clothes around the car or make noise late at night.
- Make sure you close all gates.
- Never leave any garbage or used carbide anywhere in the area. Carbide is poisonous to cattle.

- Bring the honey bucket back to base!

## Orientation

The base camps are shown on the maps. Camp 1 requires care, as it receives heavy use from OB crews. The steps up the slope become slippery when wet, so a handline is necessary; it can be anchored on a boulder to the right at the top of the slope. Bring a shovel to re-shape the steps if necessary, but carve only what is needed. Leave the honey bucket in the corridor between the mudslope and the camp; this location minimizes erosion of the slope by making it unnecessary to descend to the stream to relieve oneself (see "Cave Ethics, p. 109.

To the left of the slope and near the top, there is a long narrow ledge about 60' above the stream. A fixed line can be anchored at one end of a flake next to the slope, and into a thread-through at the other end. This makes a good group-solo site.

The stream can be waded its entire length, with the exception of a siphon downstream from Camp 1. The water is not safe to drink; crews must carry in drinking water.

A short trip could be to explore the Railroad Passage and come back out. A longer day would go to the Virgin Passage and return. A trip all the way to the back, assuming no navigational errors and no side trips, would make for a long, hard day.

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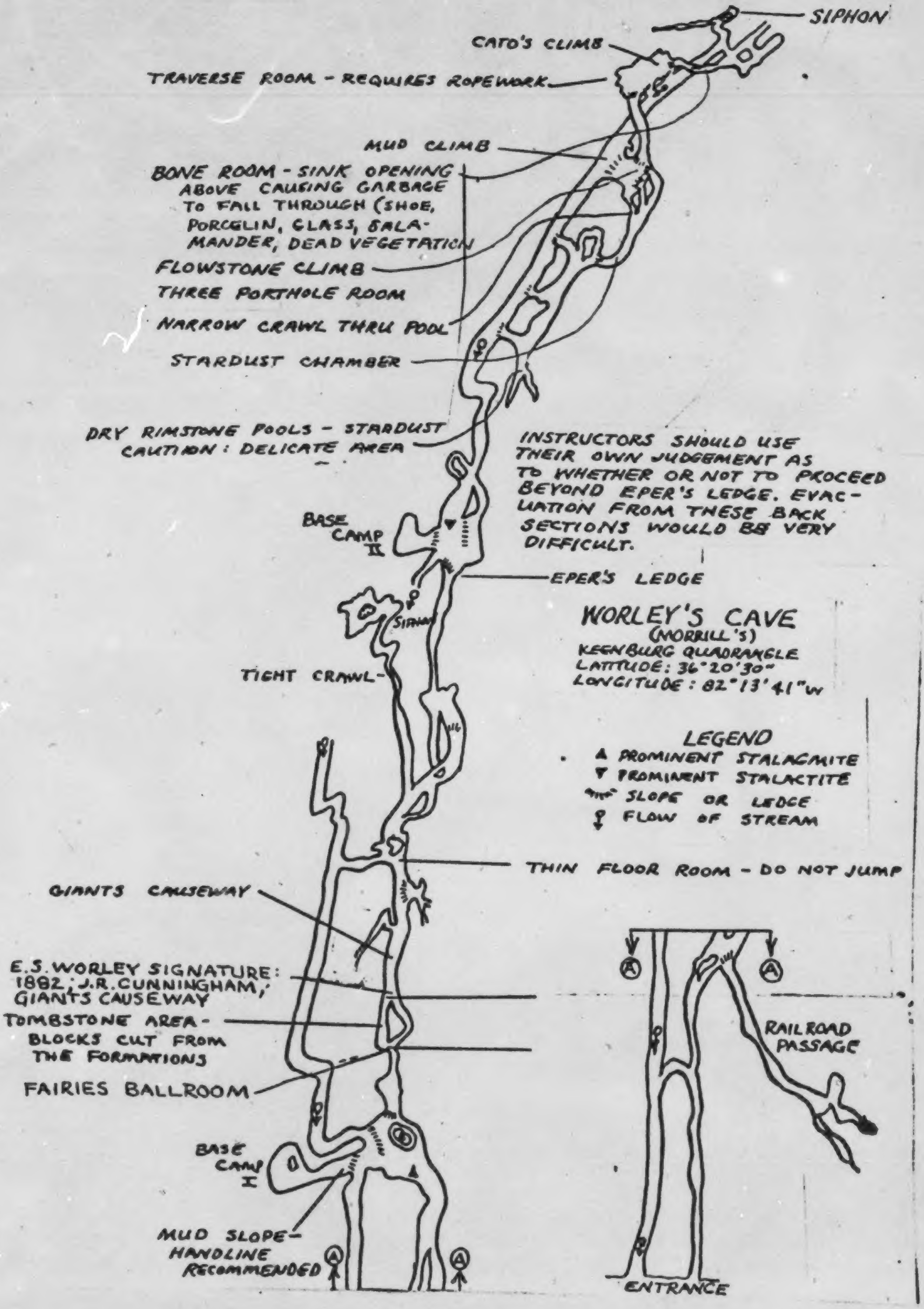
SIPHON
CATO'S CLIMB
TRAVERSE ROOM - REQUIRES ROPEWORK
MUD CLIMB
BONE ROOM - SINK OPENING ABOVE CAUSING GARBAGE TO FALL THROUGH (SHOE, PORCELIN, GLASS, SALAMANDER, DEAD VEGETATION
FLOWSTONE CLIMB
THREE PORTHOLE ROOM
NARROW CRAWL THRU POOL
STARDUST CHAMBER
DRY RIMSTONE POOLS - STARDUST CAUTION: DELICATE AREA
BASE CAMP II
EPER'S LEDGE
SIPHON
TIGHT CRAWL
THIN FLOOR ROOM - DO NOT JUMP
GIANTS CAUSEWAY
E.S. WORLEY SIGNATURE: 1882; J.R. CUNNINGHAM, GIANTS CAUSEWAY
TOMBSTONE AREA - BLOCKS CUT FROM THE FORMATIONS
FAIRIES BALLROOM
BASE CAMP I
MUD SLOPE - HANDLINE RECOMMENDED
A
A
A
A
RAILROAD PASSAGE
ENTRANCE
LEGEND
▲ PROMINENT STALAGMITE
▼ PROMINENT STALACTITE
SLOPE OR LEDGE
FLOW OF STREAM

INSTRUCTORS SHOULD USE THEIR OWN JUDGEMENT AS TO WHETHER OR NOT TO PROCEED BEYOND EPER'S LEDGE. EVACUATION FROM THESE BACK SECTIONS WOULD BE VERY DIFFICULT.

WORLEY'S CAVE
(MORRILL'S)
KEENBURG QUADRANGLE
LATITUDE: 36°20'30"
LONGITUDE: 82°13'41" W

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# NCOBS Logistics

YOU WANT IT WHEN ?!

Logistics is a support service; it provides most of the materials to run an Outward Bound course: food, equipment, and first aid supplies and transportation. The logistics staff is dedicated to providing whatever is needed to insure the best possible experience for the students. They are not totally rigid, and will try to meet special requests whenever possible. They are not, however, infinitely flexible, because they do not have infinite energy.

They can't do the whole job themselves, and therefore need your cooperation. By following the procedural guide below you will help logistics to run more smoothly. On occasion, the logistics staff may ask you to help in other ways. If something does not go well, please be patient; they are doing the best they can, and will try to correct it as soon as possible.

The information in this section will help you understand the range of responsibilities the logistics staff handles, and also the procedures they use to organize your resupplies, food boxes, equipment bins, etc.

## ☐ EQUIPMENT

### GEAR ISSUE

Each crew has its own bin in the warehouse. Before the course begins, the bin is stocked by the logistics staff. Check it to be sure you have everything before the students arrive; a checklist is included in this book. If there are any discrepancies, see a logistics person to correct them. At the same time, check the condition of the equipment, especially:

- sleeping bag zippers
- compasses for fluid
- pack liners (re-use only the good ones)
- tarps and ground cloths for holes
- carabiners for sticky gates
- repair kit and first aid kit for completeness
- stoves - make sure they work (see pp. 50-54) for more on stoves).

### RESPONSIBILITY

Students must be held responsible for the equipment issued to them. One way to split up the financial responsibility is to have the whole crew be responsible for all the gear issued both to individuals and to the crew. This eliminates the possibility of Billy taking Mary's spoon when he loses his, or everyone giggling as John's sleeping bag burns. An alternative is to have everyone be responsible for group gear, and individuals responsible for personal equipment. In either case, impress upon students the need for proper care of equipment, and talk about responsibility when you issue equipment. Students will be required to pay for lost gear and damages due to negligence (i.e. burn holes in sleeping bags, torn ground cloths, sat-upon compasses). The instructor will decide, with the logistics chief if necessary, what is negligence.

Instructors take a share in responsibility equal to the share each student takes--if there are 12 students and 2 instructors, each of them is responsible for the cost of 1/14th of the lost or damaged equipment. While students must pay their 1/14th of the cost, however, instructors' shares are absorbed by the school; they need pay nothing.

## VALUABLES

When equipment is issued, each student is asked to put her personable valuables in an envelope and seal it; the valuables are stored for the duration of the course in the safe in the warehouse. Encourage students to put cigarettes in with their valuables; since they can not get into their valuables until the course ends, temptation for cigarettes (or anything else that may tempt them) is eliminated. Personal duffle bags are stored in the locked warehouse bins.

## RESUPPLIES

Before you leave on an expedition, check all your equipment again. Resupply your crew with first aid supplies, fuel, parachute cord, and anything else you may have been using up. Mobile resupplies will not generally include equipment unless it is specifically requested in advance, but will include fuel and limited first aid supplies--generally moleskin, bandaids, tape, iodine, and other frequently-used items. Be sure that you have the correct maps for any upcoming expeditions, or that you have arranged for the logistics staff to bring them to you.

## CHECK-IN

On the last full day of the course, the instructor and crew will check in all equipment (except sleeping bags and camping equipment that may be needed the last night out) with a logistics person at a set time. Have the crew thoroughly clean the equipment, especially the stoves; logistics folks can tell you where to find Brasso, Ajax, sponges, hoses, etc. At Table Rock, put the utensils through the dishwasher.

The logistics staff cannot check the condition of every piece of equipment each course, so it is important that you check it and tell them what needs replacing or repairing. Also, check to see that sleeping bags are zipped up at least half-way before stuffing them into laundry bags for cleaning.

Damaged and lost equipment is paid for at the store on the last morning when the crew buys maps, t-shirts, etc.

## MAPS

The idea behind the present map policy is to encourage students to buy maps they used after each course, thus enabling each crew to use new maps. If it is to work, you must make sure your students take good care of their maps, and encourage them in whatever way you feel comfortable to buy maps.

Here's how it works: Maps are kept in a locked bin in the warehouse, and are closely inventoried. Four maps of each quad the crew will use, and 4 map bags are issued at the beginning of each course or expedition. At the end of the course, students may purchase their used maps for $1 apiece (please decide before your time in the store who is buying what). Maps which are not to be purchased must be turned in, in good shape, with other gear. Lost or damaged maps cost $1 apiece.

***

This is the equipment list that will be issued with your equipment.

## EQUIPMENT CHECK LIST

Please check to be sure that you have everything on the individual list and that your crew has everything on the crew list. The replacement cost is our cost plus 25% to cover reordering, etc. There will be a charge for repairs needed because of negligence, but not normal wear and tear. Everyone in the crew should sign the back side of this sheet, signifying that everyone has read this, received the equipment, and understands that you must pay for the items lost.

| | ITEM | Cost | | ITEM | Cost |
|---|---|---|---|---|---|
| __ | pack | $50.00 | __ | water bottle | $ 1.00 |
| __ | sleeping bag | 50.00 | __ | canteen cup | 1.00 |
| __ | poncho | 5.00 | __ | spoon | .75 |
| __ | carabiner | 5.50 | __ | pack liner | .75 |
| __ | sling rope | 3.00 | __ | stuff sack | 1.50 |
| __ | compass | 5.00 | __ | ground cloth | 1.50 |
| __ | whistle | .75 | __ | match case | .75 |
| __ | iodine bottle | 1.00 | | | |

### CREW

| | ITEM | Cost | | ITEM | Cost |
|---|---|---|---|---|---|
| __ | 111B stove | 45.00 | __ | shovel | 1.50 |
| __ | 123 stove | 20.00 | __ | tarps | 30.00 |
| __ | large pots | 10.00 | __ | first aid kit | 65.00 |
| __ | small pots | 9.00 | __ | tree book | 1.00 |
| __ | serving spoons | 1.00 | __ | flower book | 1.00 |
| __ | spatulas | 1.00 | __ | cookbook | 1.50 |
| __ | funnels | .30 | __ | expedition rope | 30.00 |
| __ | spice containers | .50 | | repair kit | |
| __ | frying pans | 5.00 | __ | stove pump | 2.00 |
| __ | water bottle | 1.00 | __ | griff ties | .20 |
| __ | canteen for soap | 1.00 | __ | candle | .30 |
| __ | burlap trash bag liner | .75 | __ | tape | 1.00 |
| __ | fuel bottles | 4.50 | __ | burner plate | 1.50 |
| | journals | | __ | stove wrench | .75 |
| | map cases | | __ | stove cap | 1.00 |
| | valuable envelopes | | __ | gasket | .30 |
| | candles | | | | |

These are 1979 prices. Prices will vary yearly; current ones will be printed on the sheet you are issued.

## THE OPTIMUS 111B STOVE: OPERATION

To set up: Open the lid of the box so that it forms a windshield and pull down the front part of the tank. Put on the wheel. To clean the nipple, turn it to the left; to shut it off, turn it to the right; for a full flame, turn it to the center.

Filling: Use only white gas or Coleman fuel. Do not fill the tank to more than 3/4 capacity. The tank will not hold pressure if it is full (You cannot compress a liquid with a pump).

CAUTIONS: FUEL SHOULD ALWAYS BE STORED A SAFE DISTANCE FROM THE STOVE WHEN IT IS BEING OPERATED. CARE SHOULD BE TAKEN TO NOTE THE WIND DIRECTION IN RELATION TO THE FUEL STORAGE AREA SO THAT FUMES CONNOT REACH THE FLAME SOURCE AND VICE VERSA. ALWAYS FILL STOVES FAR FROM ANY SOURCE OF FIRE OR FLAME.

Heating: Screw on the tank lid tightly. Give the pump a few strokes with the stove turned off. Open the spindle by turning the wheel a little to the left, letting the gasoline ooze out through the nipple until the spirit cup is filled almost to the brim. Turn the wheel back to the right as far as possible (turning the stove off), and light the gas in the spirit cup.

Lighting: When the gasoline in the spirit cup is almost gone (not before) open the spindle by turning it a little to the left, letting the gas out through the nipple. The gas should ignite. Give the pump 10-15 strokes. For a full flame turn the wheel to the center.

Regulating the flame: Turning the wheel a little more to the left will give a bigger flame, to the right, a smaller flame. The flame should not be regulated with the cleaning needle.

Extinguishing: Turn the wheel to the right as far as possible and leave it in that position.

Cleaning the nipple: While the stove is burning, turn the wheel as far to the left as possible, and then quickly back again. Keep a lighted match ready, should the flame go out.

To replace the cleaning needle:

1. Take off the flame ring and screw out the nipple with the wrench.
2. Turn the wheel to the left and take out the cleaning needle. Then turn the wheel back to the right as far as possible.
3. Replace the cleaning needle with the cogs against the cogs of the spindle.
4. Turn the wheel 1/3 turn to the left to let 3 or 4 cogs pass. While doing this, keep the needle pressed hard against the cogs of the spindle so that a click is heard for each cog passed.
5. Turn the wheel as far to the right as possible and screw in the nipple. If the cleaning needle is put in correctly, it should be visible in the nipple hole after turning the wheel not more than 1/3 turn to the left from the closed position.

## REPAIR

If the stove leaks: Be sure the valve spindle has been turned all the way to the right, if the leakage occurs while the stove is not in use. If the cleaning needle is not synchronized with the spindle, this may also cause leakage. If the stove won't shut off, check to see if it takes more than 1/2 turn of the wheel to bring the cleaning needle up. If it does, follow the directions for replacing the cleaning needle to reposition the needle. If vapor leaks out at the regulating spindle, screw the nut in a little tighter.

If the flame is erratic or unbalanced: Clean the nipple and/or reposition the cleaning needle.

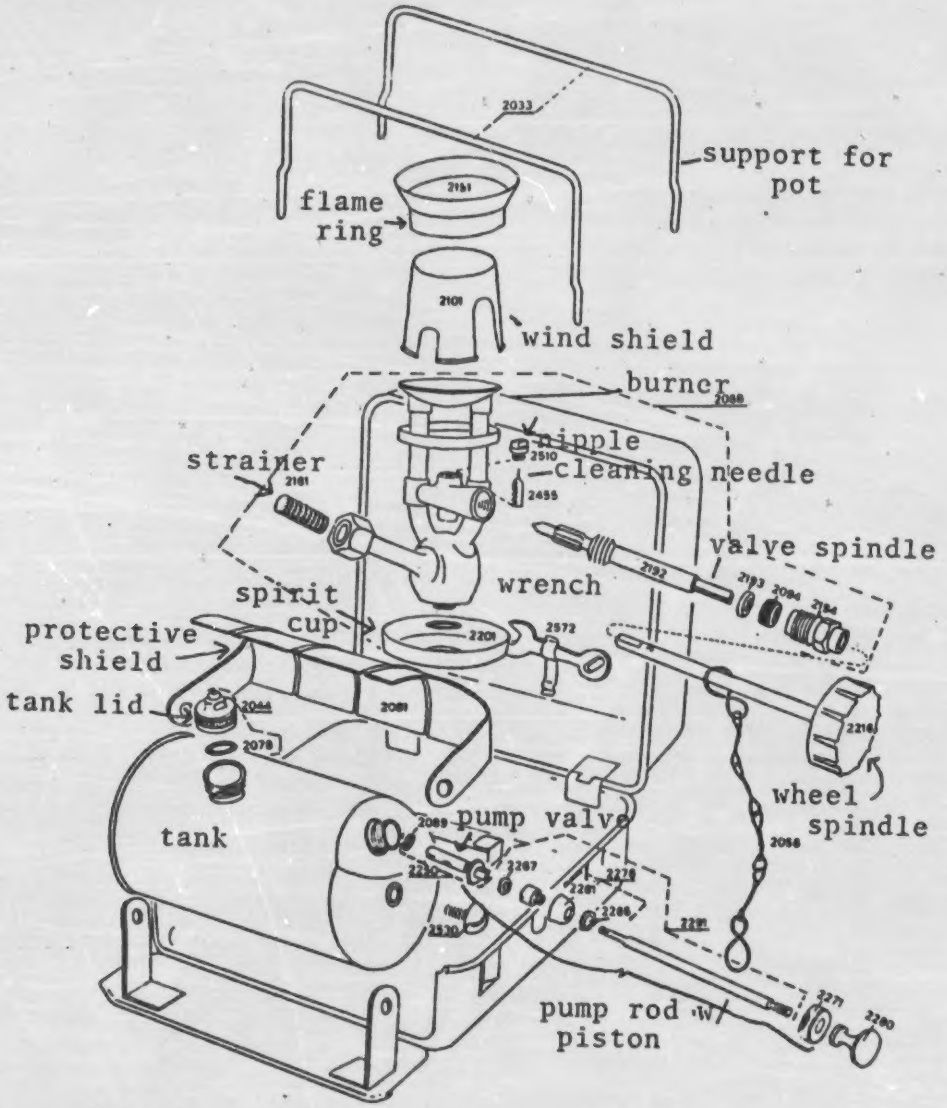
Yellow flame can be caused by: Insufficient pre-heating (start over); low pressure (pump more); a loose nipple (tighten); carbon or food on the burner (clean).

Low pressure can result from: a bad pump gasket (replace or put paraffin on); the tank lid on too loose (tighten); a bad tank lid (replace).

If the pump does not work: the leather packing has probably become dry. Unscrew the pump lid and take out the pump rod. Soak the leather washer with paraffin or vaseline and replace the pump rod, taking care not to damage the washer. This can be done safely while the stove is burning. There is a replacement pump in the repair kit.

If a small flame forms at the valve on the tank lid, turn the stove off and allow it to cool. Too much pressure has built up inside the tank. DO NOT remove the tank lid until the stove is cool.

If the flame comes out of the tank at the pump, TURN THE STOVE OFF IMMEDIATELY and do not use it. You cannot fix this in the field, and using it in this condition can be dangerous.


2033
support for pot
flame ring
2151
2101
wind shield
burner
2088
nipple
2510
cleaning needle
2455
strainer
2161
valve spindle
2192
2193
2094
2194
wrench
spirit cup
2201
2572
protective shield
tank lid
2044
2081
2078
2216
wheel spindle
2056
tank
2089
pump valve
2220
2267
2279
2281
2288
2291
2520
pump rod w/ piston
2271
2280

BEST COPY AVAILABLE

## THE PEAK 1 STOVE: OPERATION

*To set up*: Open up the three legs on the bottom of the stove and set it up on a level surface.

*Filling*: Same as for Optimus 111B stove. Move the red lever to the OFF position (see Fig. 1).

*Pumping*: Make sure the tank lid is on tight and the red lever is still in the OFF position. Turn the pump knob to the left one turn. With your thumb over the hole in the pump knob, pump 25-50 strokes. Then close the pump knob back to the right.

*Lighting*: Move the black lever to the HI position (see Fig. 1). Hold a lighted match at the burner cap and move the red lever straight down to the LIGHT position. (see Fig. 1) As soon as the stove lights, pump it several more times until the flame becomes stable. After two minutes, or when there is no more yellow flame, move the red lever to the RUN position (See Fig. 1).

*Regulating the flame*: Move the black lever between LO and HI.

*Extinguishing the flame*: Move the red lever to OFF. Sometimes it is necessary to blow the flame out.

*Cleaning the orifice*: While the stove is burning, move the black lever from LO to HI several times.

## REPAIR

*If the stove leaks at the levers*: tighten the packing nuts that hold the levers in place.

*If the flame is erratic or unbalanced*: clean the orifice and/or pump more.

*Yellow flame or low pressure*: may be repaired as the 111B stove, except that there is no nipple to tighten in the Peak 1.

*If the pump does not work*: Remove the clip from the pump cap (see Fig. 2). Turn the pump knob counter-clockwise several turns to disengage the air stem; then pull out the whole pump assembly. Work several drops of oil or vaseline into the pump leather. Replace.

THE PEAK 1 STOVE

Figure 1

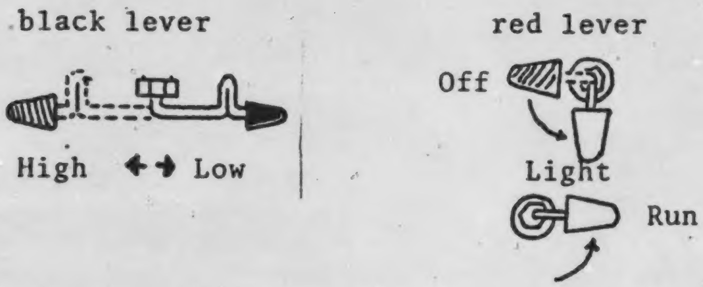
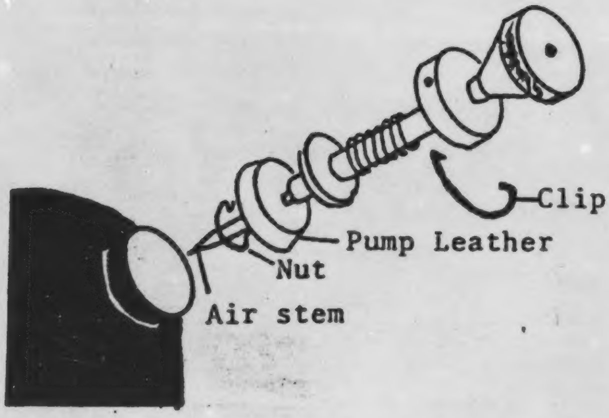

black lever
High ←→ Low
red lever
Off
Light
Run

Figure 2


Clip
Pump Leather
Nut
Air stem

## ☐ TRANSPORTATION

### DRIVING POLICIES

Driving is one of the highest-risk activities that Outward Bound is involved in. Mountain roads, the unknown of the other driver, and having 15 people in a van can combine to create a disaster. The safe operation of the vehicles is vital to the program.

To maintain driving safety, we have the following procedures:

- You must have a valid driver's license, and pass the NCOBS driver's test, before you can drive any school vehicles.The driver's test is described on p. 57.
- MAXIMUM speed on gravel mountain roads is 15 miles per hour.
- In order to monitor safe driving, we need feedback from you on others' driving. Please don't consider this to be ratting on your colleagues. It is hard to criticize another's driving, but we need to know who is and who is not driving safely. Please speak to anyone you feel you can: the individual who is speeding, course director, logistics staff, whoever. Please provide us with feedback on inconsiderate driving or poor judgement as well.
- If you damage a vehicle through negligence, you may be asked to pay part of the damages. An investigation of the accident will be conducted by a committee of persons involved, the logistics staff, and other senior staff. Please notify the logistics staff of any damages, no matter how small.
- On rare occasions, the use of personal vehicles is unavoidable, and we may ask you to use your own vehicle for school business. You, of course, have the right to refuse. You will be reimbursed at a rate consistent with costs at the time. Please report mileage to the logistics chief for reimbursement.
- Driving probation is a possibility for staff who have been found to be driving unsafely.
- NEVER LET A STUDENT DRIVE A VEHICLE.

### GAS

Each vehicle has a Texaco credit card in the glove compartment. Keep a record of the gas and oil you put in, the mileage, and any suspicious sounds or behavior of the vehicle, in the record book in the glove compartment. Try not to bring a vehicle up the mountain with less than half a tank of gas.

## EMERGENCIES

- A vehicle first aid kit is located under the front passenger seat: Contents are listed on page 171 .
- The tire jack and lug wrench are located under the driver's seat (under the hood of the pick-up truck).
- A vehicle emergency kit is located in each vehicle with emergency items for break-downs. Contents are: SHELL Emergency Repair manual, flashlight, duct tape, wire, paper clip, pliers, screwdriver, resistor for the electrical system, flares. In the winter, a sleeping bag is also carried.

## DIRECTIONS

A Driver's Direction File is in the glove compartment of each vehicle. If directions are missing for where you're going, please make a note of how you got there so the file can be updated.

IF YOU NOTICE ANYTHING WRONG WITH THE VEHICLES,
TELL A MAINTENANCE OR LOGISTICS PERSON.

## DRIVING QUALIFICATION TEST

| | | POSSIBLE POINTS |
|---|---|---|
| 1. | Check and adjust mirrors | 5 |
| 2. | Adjust seat to reach pedals if necessary | 5 |
| 3. | Fasten seat belt - check passenger belt also | 10 |
| 4. | Start engine, put in gear, release emergency brake (check order of operation) | 5 |
| 5. | Clutch control - come to a complete stop in middle of ascending hill--then begin up hill again. | |
| | a. use of low gear | 5 |
| | b. use of clutch with brake - rolling backwards | 10 |
| | c. changing gears smoothly | 5 |
| 6. | Use of horns at curve | 10 |
| 7. | Keep to right whenever possible | 10 |
| 8. | Execute a three point turn - control in reverse | 5 |
| 9. | Speed control--15 mph a must! | 15 |
| 10. | On-coming vehicle adjustment | 5 |
| 11. | Use of brake--brake before curve, then accelerate | 10 |
| | Total points | 100 |

Fewer than 80 points - Fail.

## ☐ FOOD

### FOOD BOXES

Before each expedition or activity, your crew will be given a food box containing, for example, 3 breakfasts, 3 lunches, and 3 dinners. The food will not be divided into meals in the box, however, nor will the crew be given a menu; they must decide how to ration the food through each day. A book of recipes, specifically for the foods used, is issued with the rest of the crew's equipment. Your crew will undoubtedly come up with recipes of its own, some of which will be better than the ones in the recipe book, and others--well--different.

When you are planning your course, you will need to get together with a logistics person to tell her how many meals you will need for each part of your course. In order to insure variety, your meals will be planned over the entire course (so you won't get mackerel for dinner 5 times). For each day, you'll get 1 breakfast, 1 lunch, 1 dinner, 1 snack, and additional items rationed over the length of the expedition. These include flour mix, cocoa, brown sugar, and similar items that can be used in many different meals.

Food boxes will be waiting for you outside the food hut at whatever time you request them from the logistics staff, as long as you give them 2 or 3 days advance notice. Each box will contain a bunch of food plus a food list. The foods checked off on the list are the ones in the box: the ones for your crew for your next expedition or activity. Each check mark indicates 1 serving for the entire crew (i.e. 14 apples, 4 cans of mackerel, 2 lb. of noodles). The initials of the person who packed the box will be at the bottom of the sheet. Save a list of the items which were missing (packing errors), or of which you did not have enough (planning errors) so the logistics folks can maintain some quality control. Sometimes substitutions must be made, so if you get filet mignon instead of mackerel, just take it in stride. If your crew is carrying more than 5 days' worth of food, freeze-dried items will be substituted for some of the fresh ones.

Empty food boxes should be returned to the food hut. Leave plastic food containers, rinsed out, inside them for re-use.

## IN-CAMP FOOD

Crews at Table Rock may choose to eat breakfast and dinner in the dining hall, in which case their food boxes while in camp will contain only lunches and snacks. Students should be reminded not to keep food boxes in cabins, as they attract critters. Crews at Green Cove, where there are no kitchen facilities, or crews at Table Rock choosing to "eat out" will receive full food boxes for in-camp meals. If the food lists in these boxes indicate fresh eggs, bacon, ground beef, hard-boiled eggs, salami, or other fresh foods, these will be in the kitchen refrigerator and must be eaten within an hour after their removal.

## FINAL EXPEDITION FOOD

Your crew can use one of the lists it receives in a food box to plan their food for final expedition. The food prices and budget per person per day will vary with the economy; check with a logistics person on prices for your course. The price given for each item is the price for a serving of that for a whole crew (i.e. 65¢ for 2 lb. of noodles, $1.70 for 4 cans of mackerel). Please arrange to deliver your final food list to the logistics staff 3-4 days in advance of when you will need it ready. As usual, the staff reserves the right to make substitutions.

Occasionally, during the off-season, it is possible to let a crew pack their own final expedition food. See a logistics person if you would like to do this with your crew.

## SOLO FOOD

Each student receives:

- 1 roll or equal amount of crackers
- 1/2 lb. cheese
- 1 cup nuts
- 1/2 lb. dried fruit
- 1 orange

This is designed to be light-weight and non-perishable so it can be carried throughout main expedition, if necessary. It provides students with about 2,000 calories over the three days. With the option to fast, and without a special off solo meal, remind students that it is important to begin, at least the night before solo ends, to eat. Suggest they eat the fruit to break fast, then, throughout the night and next morning, nibble on the rest of the items. They should continue eating small snacks through the solo debrief, and by dinner should be able to eat a small portion. Drinking water aids digestion. An easily digested meal for the off-solo feast is a soup with fish, vegetables, potatoes, etc. This should help them cope with the quantities and bulk of final expedition food.

Instructors have the option to receive any or all of the following:

1 lb. raisins
1 lb. granola
1 lb. milk
1 lb. oatmeal
1 cup applesauce
1 lb. cocoa
1 pkg. cookies
1 lb. M & M's

1 loaf bread
2 lb. cheese
1 c. peanut butter
1 lb. snacks
1 lb. nuts
1 lb. drinks
1 c. rice
1 c. potatoes

1 c. noodles
tuna
tomato paste
soup mix
onions
veggies
2 c. flour
1 lb. margarine
1 lb. sugar

You will be given a sheet to fill out, indicating which of the above you would like, when you plan your food boxes with the logistics staff. Treated gently, these folks are very good about trying to accommodate special requests, as long as you don't request anything too outrageous or expensive, or that the health department says needs to be refrigerated.

This FOOD PACKING GUIDE shows how much of what is planned for each of 5 breakfasts, 7 lunches, and 6 dinners, plus the possible snacks and extras.

### BREAKFAST

1. oatmeal 1&1/2 lb.
2. granola 3 lb.
3. bulghur 2 lb.
4. powdered eggs 1 lb.
   cheese 1&1/2 lb.
5. pancakes 2 lb.

### LUNCH

1. peanut butter mix 2 lb.
   apple butter 2 lb.
2. tunafish 8 6&1/2-oz. cans
3. sardines 3 15-oz. cans
4. cheese 3 lb.
5. hard-boiled eggs 28
   cheese 1 lb.
6. bologna or salami 2 lb.
   cheese 1 lb.
7. beef jerky 1/2 lb.
   cheese 1 lb.

### SNACKS

1&1/2 lb. of

figs
apricots
dates
mixed fruit
raisins
peanut and soybean mix

### DINNERS

1. ground beef 3 lb.
   or TVP 2 cups
   noodles 2 lb.
   or potatoes 1 lb.
2. tuna 8 6&1/2-oz cans
   noodles 2 lb.
   or
   rice 2 lb.

### Plus the following:

milk 3 lb.
wheat germ 1 lb.
bran 1 lb.
margarine 2 lb.
raisins 2 lb.
brown sugar 2 lb.

### Plus each day:

1 loaf of bread or 1 lb. of crackers
14 oranges or apples
1 gallon fruit drink

### DINNERS, cont.

3. bulghur 2 lb.
   split peas/lentils 1 lb.
   carrots 2 lb.
4. mackerel 4 14-oz. cans
   potatoes 1 lb.
5. chicken 50 oz.
   rice 2 lb.
6. corned beef 4 15-oz. cans
   cabbage
   potatoes 1 lb.

FOOD PACKING GUIDE, cont.

In Addition to Dinners:

tomato paste 24 oz.
onions 6
dried onions 2 c.
dried peppers 2 c.
dried celery 2 c.
dried peas or combination veggies 2 c.
2 lb. carrots
applesauce nuggets 2 c.
bacon bits 2 c.
flour mix 2 lb.
cocoa 3 lb.
salt 1 c.
puddings 2
tea
soup bases-mushroom, minestrone, chicken gumbo, onion
cheese 3 lb.
matches
extra bags
toilet paper

This FOOD PLANNING list is the list you will receive in each food box:

This list should be used to plan final food. It must be in the hands of the logistics person 3 days before the final expedition. The whole crew must have the same menu; the budget is $1.60 per person per day. We reserve the right to substitute items which are unavailable.

MEAT

| | |
|---|---|
| ground beef | $3.16 |
| corned beef | 3.88 |
| bologna | 2.20 |
| chicken | 2.88 |
| beef jerky | 4.50 |

FISH

| | |
|---|---|
| mackerel | $1.70 |
| tuna | 5.60 |
| sardines | 2.55 |

GRAIN PRODUCTS

| | |
|---|---|
| bulgur | .57 |
| wheat germ | .24 |
| bran | .20 |
| flour mix | .46 |
| bread | 1.10 |
| noodles | .65 |
| rice | .30 |
| oatmeal | .30 |
| granola | 1.71 |
| crackers | .85 |

FRUITS

| | |
|---|---|
| oranges | .63 |
| apples | .84 |
| figs | 1.15 |
| apricots | 1.23 |
| raisins | 1.29 |
| dates | 1.05 |
| mixed dried | 1.30 |
| apple sauce | .64 |

OTHERS

| | |
|---|---|
| margarine | 1.10 |
| tomato paste | 1.00 |
| bacon bits | .50 |
| matches | -- |
| soup bases | .80 |
| TVP | 2.75 |
| extra bags | |
| toilet paper | |

SPICES (no charge)

- salt
- pepper
- oregano
- thyme
- chili powder
- curry
- cinnamon
- garlic

## FOOD PLANNING list, cont.

### DAIRY PRODUCTS

| | |
|---|---|
| powdered milk | $1.35 |
| 1 lb. cheddar cheese | 1.49 |
| 1 lb. muenster cheese | 1.49 |
| 1 lb. lappi cheese | 1.39 |
| hard-boiled eggs | 1.42 |
| powdered eggs | 2.27 |

### LEGUMES

| | |
|---|---|
| split peas | $ .45 |
| lentils | .45 |
| peanut butter | 1.30 |
| peanut and soybean mix | 1.60 |

### VEGETABLES, freeze-dried

| | |
|---|---|
| peppers | 1.00 |
| onions | .50 |
| potatoes, diced | 1.00 |
| potatoes, flaked | 1.00 |
| peas | 1.10 |
| combination | 1.00 |

### VEGETABLES, fresh

| | |
|---|---|
| carrots | .36 |
| onions | .30 |
| cabbage | .70 |
| potatoes | .60 |

### BEVERAGES

| | |
|---|---|
| tea | .50 |
| cocoa | 3.00 |
| fruit drink | 1.00 |

### SWEETS

| | |
|---|---|
| apple butter | .45 |
| brown sugar | .70 |
| pudding | 1.00 |

These are 1979 prices. They will vary each year; current prices will be printed on the food lists in your food boxes.

# The Course Environment

## ☐ GEOLOGIC HISTORY OF THE SOUTHERN APPALACHIANS

The Appalachians are among the oldest mountains in the world; some geologists believe they are the oldest. 3000 million years ago, the Pre-Cambrian foundations of these mountains were being laid. In ensuing years, these sediments and volcanic deposits were so changed by heat and pressure as to make their origins unrecognizable. They were twisted and tilted, cracks were opened and filled with sediment or lava; everything was shoved around. This was all before the beginning of life on earth, so these rocks harbored no fossils, and since these ancients make up so large a portion of the Appalachians, there are few fossils in these mountains.

2800 million years later, towards the close of the Paleozoic Era, pressure from both sides pushed these rocks up like wrinkles in a rug, into a set of spectacular mooountains about the size of the present-day Alps. Then the rivers went to work eroding, and within a few tens of millions of years, the mountains were gone, except for a few low hills. There followed a long, slow uplifting of this plain, with the rivers carving gorges and ridges as fast as the uplift occurred. The Blue Ridge to the east was the most impenetrable of the ridges; hence it became the eastern continental divide, although the Smoky-Unaka-Unicoi-Bald-Stone Mountain chain to the west eventually became higher.

These periods of uplift and erosion were repeated at least twice, with the softer rocks washing away down the gorges and the hardest remaining as lofty peaks. The rivers chose to cut a confused series of cross ridges between the eastern Blue Ridge and the Western Smoky chain; the highest peak in the East, Mt. Mitchell (6684'), sits on one of these. The erosion, of course, continues today, but for now we are left with 43 peaks over 6000' and 82 over 5000' in North Carolina alone -- far higher, on the average, than any of the ranges in New England.

### PLEISTOCENE ICE SHEETS

A more recent event--the coming of the ice sheets of the Pleistocene Epoch--accounts for the great variety of plants in North Carolina. While the ice sheets did not actually reach this area, the cold climate they pushed south brought many new plants, which found themselves adequate homes on local mountain tops. When the climate changed again, many of these plants, like many a southern mountaineer, decided it was nicer to stay. Meanwhile, the old sub-tropical vegetation returned with the warmer climate, and Carolina formed the odd meeting place of the sub-tropical with the sub-Artic.

## CAVE FORMATIONS

The majority of the caves in this area date back to the Pliocene era, making them about 3950 million years younger than the mountains out of which they are carved. Most of them occur in limestone, or Karst areas, characterized by dolines (sinkholes), limestone outcroppings, shallow holes into which surface stream water runs and disappears, and rolling hills.

The chief constituent of limestone is calcium carbonate or calcite ($CaCO_3$), which is soluble in carbonic acid ($H_2CO_3$). This acid occurs commonly in nature when carbon dioxide ($CO_2$) in the air or soil dissolves in water. When this acid comes into contact with limestone, the $CaCO_3$ goes into the solution as bicarbonate ($HCO_3$). Chemically speaking:

carbon dioxide — water — carbonic acid — solution

$$CO_2 + H_2O \rightleftharpoons H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$$

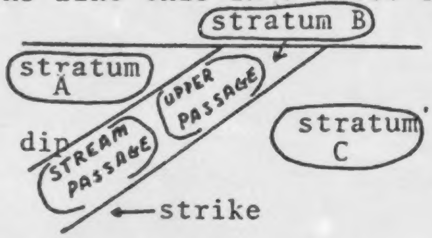
$$H^+ + HCO_3^- + CaCO_3 \rightleftharpoons Ca^{++} + 2HCO_3^-$$

solution — calcite — calcium — bicarbonate

Most caves are formed by this slow solutional process, not by the action of streams and erosion as is the case on the surface, though erosion may cause some enlargement of caves.

It is believed that these caves formed at a time when the limestone of which they are formed was under the water table. Water worked its solutional powers in the limestone along bedding places, faults, and cracks. The angle formed between a bedding plane (or stratum) and the horizon is called the dip, while the line is called the strike. Caves of the Appalachian pattern extend along the strike, with floors and ceilings inclined with the dip. Worley's Cave, for example, looks like this in a cross-section:

stream passage is "down dip" from upper passage.



The strike extends into the sheet of paper in this diagram.

The temperature of limestone caves remains stable throughout the year at the average annual temperature of the area the cave is in--here about 55° F. The relative humidity in most caves is right at 100%.

A speleothem is a cave mineral deposit. Most are formed by a single basic method; in essence the reverse process of limestone solution. $CaCO_3$ can be formed out of solution just as it can be dissolved. Water in a cave holds a certain amount of dissolved $CaCO_3$. As the $Co_2$ in the water escapes, $CaCO_3$ is released. This results in deposits of calcite; depending on how this is deposited, various formations grow. Since deposition is controlled by release of $CO_2$ (not evaporation of water: it would be hard for water to evaporate in an atmosphere that approaches 100% humidity), deposition can occur only in well-ventilated parts of the cave, and speleothems rarely develop deep inside.

Stalactites hang down from the ceiling. They are tubular, like a straw; hence the common name soda straw for the smaller ones. They are formed as calcite-bearing water drips from cracks in the ceiling and loses its $CO_2$, leaving an ever-lengthening calcite deposit. The growth of a stalactite is variable from 1/100th" to 1/10th" a year, depending on the amount of calcite in solution and the acidity of the water.

Stalagmites are formed when water drips onto the cave floor. Here the $CO_2$ is not released until the water hits the floor, and the calcite deposit is thus left on the floor. When a stalactite and stalagmite flow together, one rising from the floor and one growing downward from the ceiling, a column results.

If calcite-bearing water flows down the walls of a cave, a sheet of calcite may result, called flowstone. Sometimes these flowstone formations may be deposited over a clay or gravel wall which is later washed away, leaving curtains of flowstone. Curtains also occur where many stalactites grow next to one another into a wide sheet.

Rimstone dam formation has not yet adequately been explained. The best theory is that water flowing over the lip of the dam is agitated slightly, causing a release of $CO_2$, with its concommitant calcite deposit. This occurs more at the edges, which accounts for the development of the wall of the dam.

Helectites are rare speleothems about 1/4" in diameter and several inches in length which seem to defy gravity as they twist up and down and straight out of cave walls. A theory about their formation is that they have a small central canal through which water is forced, but the flow is so slow that no drop of water that is formed on the end can be affected by gravity.

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# ☐ HISTORY

## THE FIRST INHABITANTS

The first inhabitants of these mountains came here to hunt game about 12,000 years ago. They were nomads, hunters and gatherers who had no permanent settlements.

About 5,000 years ago, they settled into the arable valleys east of the mountains and began to raise corn, beans, squash, and melons (these are still the most common subsistence crops in these mountains). They developed use of the bow and arrow and fashioned pottery out of the clay, or kaolin, which is still mined here. Eventually, the group in this area became known as the Catawba Indians.

Meanwhile, the Cherokee Indians migrated down from the mid-west, and began to squabble with the Catawbas over who had the rights to which land. Legends tell of a major war near the end of the 17th century, which ended in an agreement that the Cherokees would stay west of the French Broad River and the Catawbas east of the Catawba River, with the land in between becoming a common hunting ground.

## THE FIRST EUROPEANS

The first Europeans to come into the area were gold-seeking Spaniards from the south: Hernando de Soto in 1540 and Juan Pardo in 1566. There is still evidence in the Toe River Valley of ancient mines which these Spaniards may have dug; the earliest white settlers found them there more than 200 years later, and the local Indians had no tradition which explained their origin. In any event, these explorers were gone within a few years, driven out by unfriendly Indians and unproductive mines.

It was 100 years before Europeans invaded the mountains again: in 1673 Abraham Wood, James Needham, and Gabriel Arthur penetrated the Blue Ridge from the east, and may have gone as far as the Great Smokies. This opened the way for the development of a lucrative trading business--Europeans' guns, knives, and powder for the Indians' furs and skins.

## THE FIRST SETTLERS

Early in the 18th century, there were few conflicts between the few settlers and the Indians of the western mountains. The settlers had little use for the mountainous Cherokee country, and the Catawba on the piedmont were friendly. European diseases, particularly smallpox and alcoholism, wiped out many of the Indians: by 1784 there were only 250 Catawbas left in the valleys. An outbreak of small pox in 1738 cut the numbers of Cherokees in half--from 16,000 to 8,000.

By the 1760's, however, the ever-increasing numbers of settlers were beginning to encroach upon Cherokee lands in the mountains. Reports of raids, scalpings, and skirmishes became ever more frequent. Two of the better-known victims were William Linville and his son, who in 1766 were killed and scalped by Cherokees in the gorge which has since been named for them. The king did not wish to displace the Cherokees, as he had found their presence a handy buffer between the English settlements and the French in Louisiana during the recent French and Indian War. So the mountains were closed to settlement in 1763, by royal edict.

While this stopped the flow of settlers from the east, it did not slow those who were coming down from Virginia and moving into the headwaters of the Watauga (near Grandfather) and Nolichucky Rivers (near Mt. Mitchell and the Roan). These were the Scotch-Irish (Scots who had settled in Ireland, not a national or racial mix) who had been taxed and regulated out of their homeland, and had come to the new world to escape the edicts of the British crown. If they knew of the ruling against settlement, they paid it no heed. Some of them did, however, buy their lands from the Cherokees when they arrived.

## THE REVOLUTION

In 1778 the royal edict was lifted, but by then it didn't matter, because the crown had lost control of its American states forever. At the outbreak of the revolution, the British Indian agent in North Carolina persuaded the Cherokees to fight with the British against the settlers, since the crown had, after all, protected Cherokee lands, and the settlers were antagonizing the Cherokees by trading rum to their youths. There followed another series of raids and scalpings, which was quelled by General Griffith Rutherford and 2400 troops in the summer of 1776. Leaving their headquarters at Old Fort, they marched along "Rutherford's Trace" into the area around Green Cove and north, destroying 36 villages along the Oconoluftee, Tuckaseegee, Hiwassee and Little Tennessee Rivers. In the July 20, 1777 Treaty of Long Island (Holston River), the Cherokee ceded all their lands east of the Blue Ridge and lands in the Watauga, Nolichucky, Holston, and New River valleys. At this early point in the war, the Cherokee took the brunt of British losses in this area.

## THE BATTLE OF KING'S MOUNTAIN: THE "OVER-THE-MOUNTAIN BOYS" PIONEER NCOBS EXPEDITION ROUTES

The war continued on the coast and piedmont, but did not again reach the mountains until 1780, when the British Colonel Ferguson sent word to the mountains that he would burn the homes of all settlers who did not swear allegiance to the crown. Over a thousand settlers (called the "Over-the-Mountain Boys") gathered in Elizabethton, Tennessee (near Worley's Cave) and marched to King's Mountain, South Carolina, where they let Ferguson know that neither alternative was acceptable; they killed him in a resounding defeat of which their descendents are extremely proud.

Their route will sound familiar to anyone who has expeditioned out of Table Rock: from Elizabethton they went over the Roan, camped at Bright's Spring, and headed down Roaring Creek and the Toe River to Spruce Pine, where they camped on Grassy Creek. From there, half went down Turkey Cove to camp near the junction of North Cove and Armstrong Creeks, while the others went up North Cove and Honeycutt Branch. Skirting south of Linville Mountain, they took the Yellow Mountain road down Paddie's Creek to the Catawba River, and reunited in Quaker Meadows, where K-Mart and Food World now stand.

## INDIAN REMOVAL

After the war, the country was again opened to settlement, a land office was opened, and speculation began. Soldiers were paid off for their service in land, and John Dillard (whose progeny started the Dillard House) was among those who staked their claims in the Little Tennessee Valley.

Many settlers moved into what was still, by treaty, Indian land. This caused sporadic fighting in which the Cherokee were repeatedly defeated. After a while, the Indian leaders determined that their people should be put on a par with the settlers, which they hoped to accomplish by adopting the settlers' culture. They set up their own industrial, educational, and farming systems, set up a Republican government and adopted a constitution (modeled on the U.S.A.'s), and one chief, Sequoia, invented an alphabet for the Cherokee language. In the early 19th century, more Indians than whites in the region were literate.

It was all to no avail, however. In addition to the white demand for farmland, pressure on the Cherokee shot up when gold was discovered in the mountains in 1828.

President Jackson determined to remove all the Cherokee once and for all, to "Indian Territory" where they belonged, in what is now Oklahoma. This surprised and disappointed the Cherokee, since they had fought with the U.S. in the War of 1812, and one chief, Junaluska, had saved Jackson's life at the Battle of the Horseshoe. Davy Crockett, Daniel Webster, and Cherokee Chief John Ross all fought the removal in Congress, but this path of lawful resistance did the Cherokee no good.

General Winfield Scott, with a regiment of artillery and 4000 volunteers, began to round up the Cherokee in the spring of 1838. The removal took place over the winter, leaving the mountains in October and arriving in Oklahoma in March, 1839. Of the 20,000 Cherokee who started the march, at lease 4,000 died along the way: their trail is called "The Trail of Tears".

## TSALI

A large group of Cherokee refused to leave, hiding in the coves and caves to escape Scott's troops. The leader of this group was Tsali, or Charley. Since Scott couldn't catch the fugitives, he made a deal; if Tsali and his sons surrendered, the others could stay in peace. Tsali agreed, and when he, his brother, and two sons surrendered, Scott had them shot. The remaining fugitives have grown into the present eastern band of Cherokee, who were finally given a reservation in the Smokies in 1876. By 1969, their number on this Qualla Reservation was about 6500.

## MORE SETTLERS

With the Indians removed, settlement could continue in earnest. But the land was no less harsh and isolated than it had been before the removal. One native said later of his claim, "This is good strong land, or it wouldn't hold up all the rocks there is around hyur"[1]. Another described traveling from Atlanta to his home in Rabun County (south of Green Cove in Georgia): "One day by railroad, the next day by horse and buggy, a third day on horseback, a fourth day on foot, and then on all fours until you climb a tree, and when you fell out, you'd be in Rabun County"[2]. Learning, literacy, and knowledge of the outside world degenerated. Men might travel once a year to the county seat for "Court Week", when the trials of local criminals provided entertainment; women rarely left home at all. This isolation continued well into the 20th century, enabling the settler to grow into the legendary "mountaineer" or "hillbilly" (neither is a native term) that we know from "HeeHaw", "The Beverly Hillbillies", and Timberland Shoes advertisements.

## SCIENTISTS

Throughout the 19th century, however, the region attracted eminent scientists, who were drawn by the diversity of plants and minerals. William Bartram, a colonial botanist, explored the Green Cove area as early as 1774. André Michaux, a famous French botanist, explored the Roan and Big Yellow Mountain in 1794 and again in 1804. It was Michaux who first informed the early settlers of the value of ginseng, a medicinal plant which is still dug and sold in this area. Arnold Guyot, a Princeton geologist, came in 1856 and again in 1858 to measure and map the Smokies. And Asa Gray, a Harvard botanist, toured the Unakas, the Roan, and the Linville Gorge country in the 1880's.

By far the most famous of the scientists in this region, however, was the geologist Elisha Mitchell, who first came to the Black Mountains in 1844. By 1857, he and Thomas Clingman* were having quite a dispute over which was the highest peak in the Blacks. In June of that year, Mitchell headed off into the mountains to make measurements. When he failed to meet his son two days later as planned, a search was started for him. Ten days later, Big Tom Wilson* found Mitchell's body perfectly preserved in the cold waters of Sugar Camp Creek, into which Mitchell apparently had fallen. By then Mitchell had made sufficient measurements to determine that Black Dome was the highest peak in the Blacks, and it was renamed Mt. Mitchell in his honor.

## THE CIVIL WAR: BUSHWHACKING IS BORN

While the state of North Carolina officially seceded from the union, the mountain region itself was split on the question of secession, and many families had men fighting on both sides. The blockade on the coast made the poor and hungry region even poorer and hungrier; salt, in particular, was scarce, and without it meat could not be preserved.

The scourge of the area was "Kirk's Raiders," led by Union Colonel G.W. Kirk. They thrashed through another NCOBS expedition route: down Jonas Ridge to raid the Confederates' Camp Vance, 6 miles from Morganton, then back over "Winding Stairs Road" across Ripshin Ridge.

> "'Bushwhacking' became the scourge of these last years (of the Civil War). Both armies learned conventional lines of battle did

> not work for mountain fighting....
> At first bushwhackers fought under pretense of military discipline. But as both armies resorted to living off the land, all rules went out the window. They degenerated into predatory outlaws warring against anyone who had provisions...."[3]

It almost sounds familiar ----------------

## EXPLOITATION

After the Civil War, wealthy industrialists of the northern and eastern cities began to discover the natural resources of the southern Appalachian region. Although early reports of gold and silver proved to hold little promise, it became profitable to mine for the mica, feldspar, and kaolin that was found instead. Coal to fire northern industries could be cheaply strip-mined. The Clinchfield Railroad, the sound of which is still heard from across the gorge at the Chimneys, was built to carry coal from the Kentucky coalfields to the main-line railroads of North Carolina. It was considered an engineering miracle when it was built through the "impassible" mountains in 1899-1908, at a cost of over 200 workmen's lives.

Lumber companies felled whole forests between 1890 and 1940. The earliest took only the best, largest trees; later, everything went. The villages of Edgemont and Mortimer, near Wilson's Creek, were major logging centers for the Ritter Lumber Company of Columbus, Ohio, and the Globe Lumber Company of Lenoir. Another company, the Hutton and Bourbonnais, worked lower down the Wilson's Creek Valley and along Craig and Harpers' Creeks. Narrow gauge rail lines ran up Lost Cove, Rock House, Wilson's, Craig and Harper's Creeks to transport logs out to the main line of the Central and Northwest Railroad at Mortimer. In other areas, wooden flumes (like the one at the Green Cove dip pool, only larger) filled with creek water floated logs down to the villages. The area was logged from 1916 to 1935; then all 3 companies moved on.

The rail lines were taken up when the companies moved on, to be used in other areas. The railroad beds remain, however, and often prove tempting to bushwhacking crews. There are several ways to tell an old railroad bed from an old logging road. Since trains couldn't turn as sharply as trucks, railroads had much wider curves, often cutting through the backbone of a ridge instead of going around it. A railroad bed might come to an abrupt stop at the edge of a deep hollow, then continue on the far side. At one time a log trestle would have carried the train across the hollow. Not far from Green Cove (at a place marked "Natural Bridge" on the Scaly Mountain quadrangle), a huge boulder spans a tributary of Shoal Creek; this was once used as a railroad trestle. Occasionally you will find an old section of rail or a spike, and sometimes there are "tie-scars": depressions from which the old chestnut ties were removed or have rotted away.

The whitewater of the region was quickly recognized as a cheap source of electricity. Duke Power Company dammed the Linville and Catawba Rivers in 1919 to form Lake James. The Aluminum Company of America (ALCOA) built many dams to provide power to process aluminum. By the 40's and 50's, when the major sites were used up, ALCOA built a number of "vest-pocket" dams on tiny sites. One of these forms Queen's Lake on Queen's Creek above the Nantahala River near NOC. The Tennessee Valley Authority (TVA) was created in 1933 to oversee the multi-purpose development of the entire Tennessee Valley Watershed, which includes the Green Cove area. Under pressure to produce power to make aluminum for the Second World War, the TVA built Fontana Dam in the early 40's. The story of that dam is much the same as it has been for many other projects of the much-maligned TVA: families were displaced; good bottomland was flooded, yearly flooding with its renewing topsoil was lost, and part of a scenic river was lost. But, folks had jobs for a while building the dam, industrial growth was nurtured, wasted power was harnessed, and disastrous floods were controlled.

The problem was and is that little of the wealth from these resources remained in the region; it was siphoned off to industrial cities in the north, while the southern Appalachians remained poor. Kephart quotes a lumberman who told him, "All we want here is to get the most we can out of this country, as quick as we can, and then get out". FDR's New Deal set up many relief projects, among them a Civilian Conservation Corps reforestation program. If you see pine trees in rows, they were probably planted as part of this program. The number of whorls (3 or more branches coming out from a point) tells their age; if they are about 40 years old, they are very likely CCC trees.

But the region still remained poor, as John Kennedy discovered while campaigning in the late 50's. Once in office, he appointed the Appalachian Regional Commission (ARC) to see what to do about it. It did nothing until a New York Times article in 1963 brought the plight of Appalachia to the forefront of the nation's consciousness. Then it put together what would eventually become the Appalachian

Regional Development Act (ARDA) of 1965. This act appropriated over a billion federal dollars for use in Appalachia: over 3/4 of it went for new roads; what was left was divided among reclamation of strip mines, reforestation, water quality control, erosion control, sewage treatment, vocational schools, and health facilities.

In 1980, the ARC remains active and continues to view roads as the key to the region's development: 2/3 of its 1980 budget will be spent on new highways. Per-capita income in Appalachia has risen from 78% of the national average in 1965 to 85% in 1980. The trend of young people to leave the region reversed in the 1970's; more people are moving in now, and the energy crisis promises to fuel the coal economy.

## MOUNTAIN INDUSTRIES

The roads, especially, have begun to change the face of the backwoods and the folks who live there, but some things remain the same, or are even experiencing resurgences.

Ginseng, which has been collected and sold by mountain folks for 200 years, is riding the crest of popularity of natural medicines; you can sell it to Bumbarger's in Morganton. At one time the woods were full of it, but since it drew a good price, it became rare, and patches of it used to be guarded with rifles. Now it remains rare, but folks can still make a little money "yarbing", which is the term for collecting it.

"Gallacking" is the term for collecting galax and other evergreens for Christmas decorations Growing Christmas trees and other ornamental shrubs is a new form of this industry which requires only that the enterprising gallacker transplant the pines, spruces, hemlocks, laurels , and--yes, even rhododendrons from the woods into her garden.

The John C. Campbell Folk School in Cherokee City, the Penland School for Crafts in Penland, and the Foxfire movement have all served to increase the value put on mountain handicrafts such as quilting, weaving, carving, furniture-making, and musical instrument construction. Mountain folks can make these at home and command a fair price for them through hundreds of outlets (many are on the road north to Boone) which capitalize on the tourist trade.

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Names with asterisks (*) are referred to in the "Origins of Names" section of this manual.

## Notes

1. Kephart, p. 36
2. Brewer, p. 85
3. Brewer, pp. 166-167

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## THE WILDERNESS ACT

This 1964 congressional act created the National Wilderness Preservation System, which included 54 extant wilderness areas, and directed the Forest Service to inventory all roadless areas of more than 5000 acres (Roadless Area Review and Evaluation: RARE). By definition, these areas were to have no motor traffic nor development of any kind: they were to appear as though they had been affected only by the forces of nature.

Of the 54 original wilderness areas, only 3 were in the East, and 2 of these: Shining Rock and Linville Gorge, were in North Carolina. Prior to 1964, the Chief of the Forest Service had the power to designate "Wild Areas" and the Linville Gorge had been so designated since 1951. Before then, several owners since the 1890's had intended to turn the gorge and river into a hydro-electrical development; fortunately this never happened. Fritz Hossfeld Jr., who owned the gorge in the 30's, built trails into the area and started charging admission to tourists. The Forest Service bought the land from Hossfeld's daughter in 1952; the purchase was made possible by a $100,000 gift from John D. Rockefeller, who gave the land to the National Park Service.

Ironically, the Linville Gorge, which is the only "wilderness" in which we travel, is probably the worst littered and over-used area we use. Its very designation as a wilderness attracts folks to it and requires that restrictions be put upon it; other wilderness areas all over the country have suffered similar fates. Our best use of it might be as a teaching tool, to help folks understand how much care is necessary if an environment is to remain in its natural state.

Another expedition area, The Harper's Creek watershed east of HWY 181, has been set aside for study as a possible wilderness area under the Eastern Wilderness Act of 1974 and RARE II (an extension of the original RARE effort). FRAMCO, a French-American corporation, has been exploring this area for uranium for several years; roadcuts along 181 are said to be radioactive, and the water in this watershed contains a relatively high proportion of radioactive isotopes. The Wilderness Act permits mining prospects, but as of now it looks doubtful that this area will be mined.

## HUMAN PHENOMENA

Deservedly or not, there are a few things for which the southern Appalachian region is famous. One of them is bluegrass music, another is moonshine whiskey, and another is is family feuds and murderers. Whether or not we are natives of this area, we end up representing it because we are instructors here, and it behooves us to know a few of the facts behind our image. Besides, some of this stuff is pretty interesting.

Moonshine is the term the Foxfire books use for illegal whiskey; Kephart says it is called "blockade liquor"; more often around here you'll hear "white lightning". It's white or clear because it isn't charcoal-filtered like darker whiskeys you can buy legally.

Making it is not an easy way to get rich. You've got to hide your still in some god-awful rhododendron thicket and crawl to it by a different route each time so you don't make a path. You've got to sprout your corn, then grind it, and wait 8-10 days for this "sweet mash" to ferment to "sour mash" while protecting it from hogs and cattle, who love the stuff (horses hate i  and won't drink water tainted with it; through this some stills have been discovered). This mash must then be boiled off and condensed to make whiskey, and if this isn't done at just the right temperature (which the blockader generally has to guess), you end up with alcohol instead. Then you've got to bottle it, get it out of the rhododendrons, sell it before it's discovered, and move your still before it's discovered. Still, the liquor from a bushel of corn can bring a mountain family 2-3 times the cash that the same barrel of corn could buy as a vegetable, and often there is a closer, quicker, market for the liquor.

Prohibition was welcomed by blockaders because it ended a lot of their market competition. During Prohibition, local sheriffs were responsible for arresting blockaders, and since they were generally friends of the blockaders, they rarely went hunting for stills. If one was reported, they had to go after it; if the blockader was discovered redhanded (which is rare; they generally have pretty good warning systems), the sheriff would simply ask him (women were rarely blockaders; they were more often the good warning system) to dismantle the still and report to post bond when it was convenient. Invariably the blockaders did this, paid their fines as a reasonable consequence of the risk they took, and went back about their business. Blockading was not considered a crime, merely a breach of a rather arbitrary law.

Since then, the quality of moonshine has gone down, as some folks saw Prohibition as an easy opportunity to make a fast buck. Federal agents now actively stalk illegal distillers, and some folks in the region think this is just as well since the quality of the product has gone down so much that it is actually dangerous to drink. But the tradition--and the trade--continues: in 1967 it was estimated there were 750 illegal stills in Georgia alone[1], and it's reasonable to assume that the mountains of our region harbor just as many.

Feuds and murderers: Kephart explains that, in a wilderness, courts are feeble, and in their absence one turns to her family for security and protection. Similarly, she defends her family and its honor above all else, including the law. Toynbee ties the habit of feuding, in a rather controversial article, to the Scotch-Irish blood of many of the settlers. In any event, the bloodshed has been limited specifically to the families involved; it is not an excuse for mass murder. A man gets shot in a row over women or hogs, his brother takes revenge, and it keeps going til a whole family is either wiped out or moves away. There is no evidence of recent active feuding.

The Howard-McGhee feud is the most famous one near here: it took place on the lower Little Tennessee River. The animosity began when Tom Howard eloped with Alva McGhee, then only 13, and Alva's brothers didn't approve. Joe McGhee (Alva's brother) shot Ernest and Henry Howard (Tom's brothers) as they were walking home on day in 1898. After several interim scrapes, Charles Jones (Alva's uncle) was the next one killed in a general affront between Jones's (now fighting with McGhees) and Howards at a hotel in 1900. Two years later, a few more Jones's shot Tom Howard. Other major figures fortunately died of natural causes or accidents, but descendents can still get stirred up at one another. Both families were leaders in their community.

Of local murderers there are more tales. One murder took place at the Cebe Miller mine just below Flatrock in the Toe River Valley, where the road curves between Spruce Pine and Bakersville. A dispute over the ownership of the mine led Ed Ray and W.A. Anderson to kill 4 others who were working the mine. Ray and Anderson were captured on Fork Mountain and jailed, but they escaped and were never re-captured.

Another story tells of George Feller, who lived on Buck Creek near Marion with his asthmatic wife, Kathy. One night Kathy had a severe attack, and George alerted the neighbors to go for help, but by the tine the doctor arrived, Kathy was dead. A man on horseback met the funeral procession on the road the next day and told those present that he'd seen in a dream that the woman in the casket had been murdered. An investigation in the Fellers' house turned up a strap with strands of blond hair caught in it, and an autopsy showed that Kathy had been strangled. Confronted with the evidence, George broke down and confessed. He was the last man to be hanged in McDowell County, and the noose didn't break his neck--it strangled him.

By far the most famous murder in these parts was Francie Silver's butchering of her husband Charles just before Christmas in 1831. This gruesome event took place in their cabin at Deyton Bend on the Toe River, not far below the campsite at Mile 17. Francie complained to her neighbors that her husband had been gone for several days and she didn't know what had happened to him. Suspicions were aroused when someone noticed that the fireboard and mantel in her cabin had been freshly chipped with an axe (Francie had done this to rid it of spattered blood). Further searching revealed blood under the cabin floor, and bits of bone amidst the ashes in the fireplace. Outside, hidden in a hollow sourwood tree, were parts of a body that wouldn't easily burn.

Francie Silvers stood trial in Morganton and was sentenced to death by hanging--the only woman in North Carolina ever to be sentenced to death.

Bluegrass music got its name indirectly from the state of Kentucky (the Bluegrass State), but its roots are in the southern Appalachians in general. The music of the mountain region came, like its settlers, from the British Isles. Because the settlers were isolated, their music remained much the same until their region made its belated entrance into the 20th century in the 1920's and 30's. "Old-timey" string bands, playing southern dance music on banjo and fiddle, became popular with that emergence. Record companies sent scouts into the mountains and made on-the-spot recordings in local hotels. The Carter Family got its start this way in Bristol, Tennessee, in 1927.

The influences of Negro music and urban jazz gave birth to the first modern bluegrass music in the late 30's. That's when Earl Monroe, a mandolin player, formed a group called "The Bluegrass Boys" to sing "a new kind of country string band music". They set the style and gave it a name. When Earl Scruggs popularized 3-finger banjo-picking in the early 40's, bluegrass had arrived.

The sounds of its southern Appalachian roots are still evident in bluegrass music. The high-pitched leads are an outgrowth of the style in which British ballads are sung. The close harmonies and the solo-and-chorus form are remnants of mountain church singing, reflective of the manner in which itinerant preachers taught the local folks to sing, hoping to save them from the sins of, among other things, secular music.

Note

1. Wigginton, p.304

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## ☐ NATURAL HISTORY

The purpose of this section is to provide basic, non-technical, easily-used information about the living things in the course environment. More complete information is available in the Master Tree Finder and Flower Finder carried by each crew and in the reference works in the NCOBS staff library.

### COMMON TREES

### Conifers

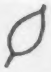
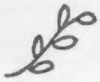
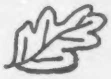
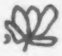
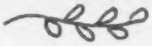
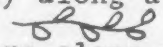
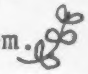
Pine: an evergreen with needlelike leaves, usually borne in clusters or bundles of 2-5. The cones, usually longer than they are wide and tapering to a point, are the hardened woody scales of flowers. There are two types of pine--soft and hard. We have only one soft pine, the Eastern White Pine. Needles are long and a soft bluish green, coming in bundles of 5. The cones are long and curved. Hard pines have needles in bundles of 2 or 3, darker-colored wood, and cones armed with spiny tips.

Spruce: dense crowned, tall tapering trees that have "buttresses" at the base. The bark is thin and scaly. Leaves are evergreen needles that spiral around the branches, extending out on all sides of the branch. Needles are 4-angled (flattened on some) stiff, and sharp. Cones (which hang down) are egg-shaped, with thin woody scales.

Fir: a small-to-medium tree with needles on two sides of the branch. The needles have 2 silvery-white bands on the underside. The cones, rather than hanging down, sit erect on the branch and have scales that are wider than they are long.

Hemlock: has a definite fragrance--like Christmas. For a positive identification, just crush some of the round-tipped needles and smell. The needles are short, marked on the lower surface by two pale lines, with their stems growing from rounded, dark-orange woody pads on twigs. Cones are oval, with scales as wide as they are long. This tree is very tolerant to shading. Its top is tipped over like a long stocking cap; all other conifers have erect tops.

## Deciduous Trees

Deciduous tree leaves are either:
*Simple*--not made up of leaflets  or 
*Compound*--made up of several leaflets.
Sometimes they are
*Lobed*--with deeply indented margins. 
Compound leaves may be
*Palmate*--leaflets attached at one point on the stem, 
or
*Pinnate*--leaflets attached at several points along the stem. 
Pinnately compound leaves may be
*Alternate*--leaflets attached singly along a stem, alternating sides, or 
*Opposite*--leaflets attached in pairs along a stem. 
Only 5 native trees in this area have opposite leaflets: maple, ash, dogwood, horsechestnut, and buckeye. These may be be remembered with the mnemonic: MAD HORSES BUCK

*Oak*: a decorative shady tree with alternate leaves and the familiar acorns. Twigs usually have clusters of buds at the tips. *White oaks* have leaves with *rounded* lobes (*white mans' bullets*). Their acorns are not bitter and are hairless inside. *Red oaks* have leaves with *pointed* lobes that are often tipped with bristles or spines (*red* Indians' *arrows*).

*Hickory*: Leaves are compound, alternate, and odd-pinnate (with a terminal leaflet). Each leaf has 3-17 roughly oval, pointed-toothed leaflets that are aromatic when crushed. Flowers are 3-branched, slender, drooping catkins. The fruit is an edible nut with a smooth shell between ridges; the bark is a smooth gray that becomes very rough and scaly on older trees, and often seperates into long strips.

*Ash*: has opposite leaves, each having 3-11 leaflets with toothed margins. The fruit is a single-winged seed, born in clusters on slim stems. The bark is thick, furrowed or scaly, and usually ash-colored on the branches.

*Maple*: has opposite, simple, palmately-lobed, toothed, long-stemmed leaves. In a few, the leaves are pinnately compound. The seed has a pair of wings in a U or V shape.

*Mountain magnolia*: has probably the largest leaves you'll see in the forest(10-12 inches). They are oblong with a narrow lower end. A small tree with wide-spreading brittle branches, it is found in rich coves and on cool slopes.

Tulip-poplar: has a long very straight trunk, sometimes clear of branches for 80 feet. The bark is light gray, sometimes brown. Flowers are tulip-like with yellowish-green petals that are marked with a reddish-orange band near the base. Leaves are lobed (the outside 2 have square ends) dark green in the summer and bright yellow in the fall.

Sassafras: leaves are the most distinguishable feature. Each tree has both entire (not lobed) and two- and three-lobed leaves. If you see a tree that has several differently shaped leaves, one of which looks like a mitten, smell the stems. If they smell good enough to eat, it's sassafras.

American holly: spiny, wavy-edged glossy leaves along with bright red berries. Looks like Christmas. Usually 40-50 feet high.

Sourwood: the bark is thin, light gray, and divided into narrow shallow ridges. Leaves are 2-5 inches long, simple, alternate, very acid to the taste. Flowers are small, white or cream colored, in panicles from 5 to 10 inches long on the end of twigs.

Dogwood: small trees, loved for their beautiful white blossoms in springtime. The bark is dark red-brown, dividing into small scaly blocks on older trees. Leaves are opposite and have curving symmetrical veins..

Sycamore: easily recognized because of its multicolored mottled bark, which looks like a jigsaw puzzle. Whitish bark that covers the trunk and branches of the upper part of the tree falls off in irregular patches, exposing brown, green, and gray bark underneath.

Locust: Leaves are 8-14 inches long, each made up of 7-19 oval leaflets alternate on a long slender stem. White flowers are fragrant and hang in clusters. Fruit is in brown flat pods, bearing kidney-shaped, dark orange brown seeds. Bark is deeply furrowed, dark reddish-brown and scaly.

## Local Tree Terms

| | |
|---|---|
| Leucothoe | is called hemlock |
| Hemlock | is called spruce pine |
| Spruce | is called he-balsam |
| Balsam | is called she-balsam |
| Laurel | is called ivy |
| Rhododendron | is called laurel |

## USEFUL PLANTS

Be sure that you know you know these plants. Often, your nose is your best identification tool.

Acorns: though edible, some are not necessarily tasty until roasted.

Dandelion: one of the most widely used plants, as so many of its parts are edible. Roots may be boiled for 5 minutes and buttered (much like a parsnip). Eat the crowns cooked or in a salad. Use the greens (the rosette at the base of the plant) as you would use any green. The blossoms, when still inside the crown, may be plucked out and cooked for 3 minutes. They are also used for making wine and coffee, but the process is lengthy.

Eastern hemlock: Tea is made of the light young needles, which are rich in Vitamin C. The smell of the stripped leaves is quite strong and a good way to positively identify the tree.

Ginseng: Found in cool dense woods, and used for emergency food and tea. It is also used in the mountains for diarrhea and dysentery. Leaves can be made into a tea, and the parsniplike roots can be eaten cooked or raw. The over-collection for sale as a medicinal herb has made this once common plact quite rare.

Huckleberry, blueberry: Eat these right off the bush in July, August, and September.

Jewelweed: The young shoots (up to 6 inches) may be eaten after boiling in water for a total of 10 minutes, changing the water twice (don't drink the water). Washing with raw juice from the crushed stems and leaves soothes nettle stings and prevents poison ivy rash.

May-apple: In late summer, the fruit can be eaten (just as the plant begins to wither and die). Juice can be added to lemonade. Warning: the roots, leaves, seeds, and green fruit are strongly cathartic and should not be eaten.

Mints: If a plant smells like mint, it probably is. Check to see if the plant has a square stem and paired leaves. Use it for teas, flavorings, jellies, sauces, dressings, drinks. Steep in water for 5 minutes. Good with trail lemonade, too.

Rock tripe: are the common gray or olive brown "flaps" of lichens that can be simmered for 1 hour and added to soups.

Sassafras: for tea; wash the roots, chop into small pieces, boil until the tea is a pale reddish color, sweeten and serve.

Sweet birch: (also called cherry or black birch) twigs and bark smell like wintergreen. To make a tea, boil a handful of twigs. Nibbling on the twigs while hiking will allay thirst.

Wild ginger: is a little plant with heart-shaped leaves, dark green above and light green below. A good "second" seasoning for tea. It is also used as a spice, medicine, and candy. If you tear the plant leaf and smell it, the odor will by very pleasant.

Wild strawberry: looks like common strawberry, only smaller. Use it as you would the cultivated variety. The leaves make a nice tea.

Wild onion: If a plant smells like onion or garlic, it is probably safe. Growing from basal bulbs, the leaves may be either tubular or flat. Use it as you would any onion.

Wood-sorrel: is a cloverlike plant with heart-shaped leaves that often fold along a central crease. It tastes sour and is rich in Vitamin C. Use it in salads, or for cold drinks: steep leaves for 10 minutes in hot water, let cool and sweeten.

## COMMON MAMMALS

With a large group, it is often difficult to spot animals, but there are many signs of their presence you can spot as you hike.

Black bears:

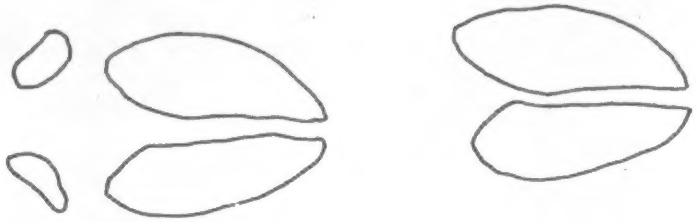
- Have four toe marks; the little toe claws don't show up in the footprint.
- Leave hair on trees after rubbing them, along with claw and tooth marks.
- Strip the bark off pines, spruces, and firs.
- Tear up berry patches--look for branches stripped of twigs, fruits, and leaves.
- Eat ants and beetles; hence they will tear up old logs and turn over rocks. There will be prominent diggings,

with big holes, flung dirt, and claw marks.
- Leave uniform scats, consisting of grasses, roots, wood shavings, berry seeds, and sometimes hair. The scats are in disjointed segments.

If a bear notices you and rears up on its hind legs, it is only trying to get a closer look and smell. Bears are very near-sighted. If it goes on all fours and roars and growls, you have cause for worry.

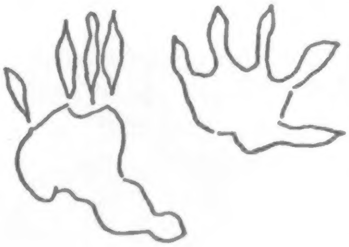
Deer (white-tailed):

- Feed on low-growing succulent plants, and, in hardwood forests, acorns.
- Hold aloft their white tails when fleeing (you may see a "flash" in the woods).
- Cries out "whiew-ew-ew" when alarmed.
- Track looks like this:



Oppossums

- Will eat anything--small mammals, birds, eggs, insects, fruits, carrion, and garbage.
- Seek shelter in the dens of other animals, in crevices, under rocks, and in hollow trees.

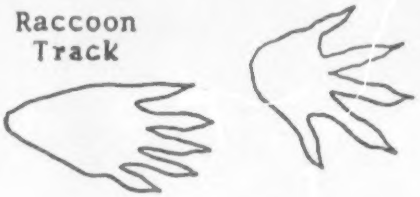


Track: On the hind foot the big toe slants inward, and the 3 middle toes remain in a grouping seperate from the others.

Raccoons:

- Wash their food because they have no salivary glands.
- Are fond of wet places and hollow trees.
- Live in trees. Look for a downward sloping trunk with a hole about 6 inches in diameter, and grayish-black hairs and scratches in the bark caused by their powerful front feet.

- If no trees with holes are in the area, look in hollow logs or clefts in rocks.
- Like to eat crawfish, corn, and whatever you have in your pack.
- Leave granular scats, even in circumference, containing berry seeds. They can be confused with those of the skunk. They are usually deposited on logs or bigger branches of trees.
- Have tracks that are usually paired, with left hind foot place beside the right forefoot.



Muskrats:

- Build a dome-shaped lodge of sticks, roots, and stalks, which bulks about 3 feet above the surface of a shallow pond. Nearby is one like it, only smaller, which is a feeding chamber. Inside the dome is dry. A small pile of vegetation back from the bank hides the entrance.
- Have hind feet that are much larger than the fore and are partially webbed. They also drag their tails, so tracks are easily recognized.

Skunks:

- Shoot a spray about 15 feet, but the smell can carry for a half-mile if the wind is good.
- Dig small pits in the ground about 2 inches deep and 4 inches across to look for insects.
- Usually use natural holes or abandoned burrows for homes. The entrance may have hair and a faint smell.
- Leave droppings of berry seeds and the indigestible coverings of many types of insects.

Beaver:

- Make a slap-plunk sound with their tails at dusk and during the night. Sounds like someone is slapping the water very hard.
- Build dams and lodges of logs, branches, stones, and mud, which have underwater entrances. The dams keep the water level constant, protecting the lodges.
- Have valves in their noses and ears that close when they submerge.

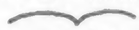
## COMMON BIRDS

The folowing are birds that you are likely to see or hear in this area. The ° means that you are more apt to hear than see the described bird.

### Birds of Prey

Turkey Vulture: larger than a hawk, more abundant than eagles. You can often see them either roosting in large numbers, or around roads looking for dead carrion and garbage. When in flight, they roll and sway from side to side, holding their wings (which span about 6') upward in a shallow " ". The head is red and featherless.

Hawk: smaller and faster in flight than turkey vultures. It feeds on small birds and ammmals. Many are seen soaring high in the air.

- Sharp-shin: long, square-cut tail, short rounded wings. Voice: sharp kick-kick-kick, and shrill squeel.
- Broadwinged: black and white tail, brown body, crow size. Hunts from perch instead of soaring. Voice: thin whistle, sounds like pweeeeee!
- Red-tailed: dark belly with broad fan-shaped reddish tail (ranges from pink to reddish brown), long, slightly rounded wings.
- ° Red-shoulder: most common in eastern North America, with red shoulders both under and on top, also having long slightly rounded wings.
- Osprey: or "fish hawk". You're likely to see it on Section III of the Chattooga. This species was heavily affected by DDT, which caused shells of the eggs to be soft, more easily broken by prey. It is making a comeback since DDT was discontinued. The wings are white underneath with black markings, and are carried in an arched position " ". Ospreys feed only on fish, which they grab with their talons while flying low over the water.

Owl: in this area it is usually nocturnal. It has a large round head with a disk-like face. If you hear an eerie call at night, it is probably some type of owl. During the day, it can be spotted roosting quietly in a tree.

- Screech: small (about 8") with prominent ear tufts. Eyes are yellow; body is reddish brown or gray. Voice: a wail, soft purrs, or trills.
- Great horned: largest of all in this area. It is 2' high and has ear tufts. Voice: 4-7 low and

far-carrying hoots; hoo-hoo-hoo-HOO HOO (second and third notes shorter than the others).

°- Barred: large and stocky, no ear tufts. There is a pair living at Green Cove. Voice: sounds like "who cooks for you".

- Barn: crow size, with a very distince heart-shaped face. Likes hollow trees, has a strange habit of lowering its head and moving back and forth. Voice: a soft ascending wheezy cry. If around its nest, it will hiss. You will be lucky to see this one, but it is one of the most beautiful of owls.

Eagles: are very rare in the mountains and only slightly more common along the coast. The U.S. Fish & Wildlife Service has no records of sightings in this area in several years. If you see one at all, it is likely to be hunting the high grassy balds for small mammals for food. The mature bald eagle will be familiar from the presidential seal; the golden eagle looks like a very large hawk with ruffled legs.

Others

° Whip-poor-will: jay size, leafy brown colored with a black throat. At night, lights will cause its eyes to reflect ruby red. It hides in leaves during the day to sleep. Voice: Repeats its name over and over -- "whip-poor-will".

° Ruffed Grouse: Size of a small chicken, fan tail, camouflages itself well. While hiking (especially bushwhacking) the lead person may flush or scare one of these, which will create quite a commotion and probably scare you worse. It is a very capable runner, and forages the ground for seeds. This is the bird that you hear flapping its wings, thumping first slowly then very fast on a hollow log. The male attracts the female in this way.

° Kill deer: about 8" tall with a short neck, white breast, short rust-colored tail, and 2 black neck bands. It is nick-named "the ham", for when a predator approaches its nest, the adult fakes an injury, dragging a wing as if badly wounded. After this lures the oncomer away from eggs or young in its nest on the ground, it flies away. Voice: very loud and distinct kill-DEEE.

Kingfisher: about the size of a pigeon, its head looks too big for its body, and it always looks like its hair (or feathers) is messed up. You can often see groups of them perched on telephone wires. It flies above water with one or two strong wing beats, followed by a short glide, catching water-life in its beak for food.

° Woodpecker: It looks like Woody the Woodpecker. A piliated woodpecker lives at Table Rock, and just before a rain, its pecking noise echoes throughout the woods, sounding very hollow.

Raven: larger than a crow and shaggier. Soars like a hawk and looks like it has not combed its hair. Voice: Its wooden sounding "wonk wonk" is not as grating as that call of the crow.

Blue Jay: blue with white on wings and tails, and a distinctive crest on its head. It's noisy before a rain or when squawking at a predator (You may be the predator!).

° Mockingbird: about the size of a robin. It is a gray bird with white patches on its short wings and tail.. It has a slender bill, is very territorial, even attacking its own reflection. Voice: Beautiful song, often imitating other birds for hours.

° Meadowlark: looks like it is wearing a yellow v-neck sweater with black trim. Voice: clear mellow whistle. See-you SEE-yeeeee.

° Sparrow: about the size of your hand. A small common brown bird that seems to be everywhere.

° Tufted Titmouse: size of a large sparrow, colored grayish with some blue/gray tint to the head and a distinctive crest like a blue jay.

° Chickadee: a little smaller than a sparrow, with a black cap and a black bib or beard.

Indigo Bunting: sparrow-sized bird of brilliant blue. So brilliant you'll know when you have seen it. Short stocky beak.

## SOME TIPS ON SPOTTING WILDLIFE

- A blue jay constantly calling can mean it has spotted a predator. Look out for a fox.
- A flock of crows cawing angrily and milling about might mean they have a bird of prey (the traditional enemy of the crow) up a tree. Look for an owl or a hawk.
- Look for horizontal lines against vertical trees, rather than an entire animal. Also, look for parts of the whole: corner of the head, tip or the tail, etc.

- If a large animal jumps in front of you while traveling in a van at night, don't swerve. Instead, dim your lights. That momentary flash of darkness will unmesmerize it and allow escape.

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## ☐ NATURAL PHENOMENA

Some local legends to fill the eerie silence of rest stops on all-night bushwhacks--

Brown Mountain Lights: These mysterious shimmerings over Brown Mountain, southeast of Table Rock, are supposed to appear on moonless nights in midsummer or early autumn. They usually rise from somewhere below the crest, then hover in the air over the ridge. Some say they drift slowly, fading and brightening. Others say they sometimes appear to whirl like pinwheels, then dart rapidly away. Theories have been advanced that the lights are caused by escaping methane from swampy areas near the crest, moonshine stills, or phosphorescence. Because the Brown Mountain Ridge is below the horizon when viewed from Jonas Ridge or Wiseman's View, other theories strongly suggest that the lights are simply from cars, trains, or houses and villages in the distance beyond the mountain.

One U.S. Department of the Interior study discredits all mystery and flatly states that "about 47% of the lights were due to automobile headlights, 33% to locomotive headlights, 10% to stationary lights, and 10% to brush fires". Experiments have indeed shown that thermals (warmer air) rising on either side of a ridge like Brown Mountain can produce curious effects on lights when viewed from certain angles. But there is one thing unaccounted for in this study; the Brown Mountain Lights have been part of the legend of this area since long before the appearance of automobiles, trains, or even white men. Geraud de Brahm, a German engineer who was the first white man to explore the region in 1771, mentioned the mysterious lights in an account of his travels. They are part of local mythology as well.

The discovery of uranium in the area has fueled new theories in the search for a plausible answer to the phenomenon. One geologist has said that he has seen similar lights on other mountains rich in uranium, but other experts have stated that this is impossible. Such dispute is typical of the Brown Mountain Light mystique.

Maybe Scotty Wiseman had it right in his old bluegrass song about the legend; Maybe it's the lantern of a slave's ghost who endlessly searches the mountain for his master who was lost while hunting many years ago..

Whatever the case, there are a heap of folks who hope the mystery is never solved.

Burntrock Ridge lies northwest of Green Cove in Graham County. Around the turn of the century, some bear-hunters made camp there, built a fire, and fell asleep. When they awakened, the fire was still burning, but the wood was gone and the flames were eating right into the earth. The hunters took off in a hurry, which was fortunate since the fire kept burning for days. Smoke filled the valleys as far away as Tusquitee Creek. Folks thought the world was about to end and spent a lot of time praying. After 7 days, the fire went out of its own accord. On the ridge at its site, there was nothing to suggest what had fueled it--only burnt rocks.

Mountain Music was a term coined in 1878 for a snapping hum that came from one of the glens just below the summit of the Roan. At that time there was a very fashionable hotel called "Cloudland", on the bald, and tourists out for mountain strolls heard the music every summer. It was loudest during thunderstorms and was thus thought to be an electrical hum that was caused by the meeting of differently charged air currents in the glen. In 1903 the hotel, losing money, was torn down; since then interest in the "mountain music" has waned.

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## ☐ NATURAL SIGNS OF TIME AND DIRECTION

- Polaris (North star) is always due north. The line formed by the two stars which form the lip of the Big Dipper points to Polaris, and it is the end star of the handle of the Little Dipper. It never moves, and all stars appear to revolve around Polaris.
- Stars rise in the east and set in the west (as do the sun and moon), except the stars around Polaris, which never set.
- Venus can be seen in the west three hours after sunset. Except for several months out of the year, it is first to appear in the evening and last to disappear in the morning. The non-appearance months vary from year to year.
- Meteorites (falling stars) are very cold inside (-459° F--the same as the temperature of space). The light and heat around them comes from the compression of the the air that cannot get out of the way as they fall. When a meteorite hits the earth, there is frost in the area of impact.
- To tell time with a compass, orient the compass to north, place a thin stick upright in the center of the compass and mark the degree number where the shadow hits. Each 15° off North is an hour before or after noon. Add or subtract accordingly from North (12:00). If the shadow read 330°, for example, subtract 330 from 360 = 30 degrees or 2 hours. 12 - 2 = 10:00 a.m.
- To determine direction with your watch, point the hour hand at the sun. South is halfway between that hour hand and twelve. Remember to compensate for daylight savings time.

## TELLING TIME BY THE MOON

"I wouldn't set my watch by it, but it does have some practical applications, i.e. you want to get started before dawn, but don't want to give your crew a watch, and don't want to have breakfast at 1:15 a.m. thinking it is 5:30" - John Logsdon

### A list of facts

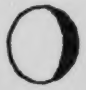
1. The full moon rises at sunset, is "overhead" (actually due south) at midnight, and sets at sunrise.
2. The moon rises 50 minutes later each day than it did the day before.
3. A waxing moon rises before sunset.
4. A waning moon rises after sunset.

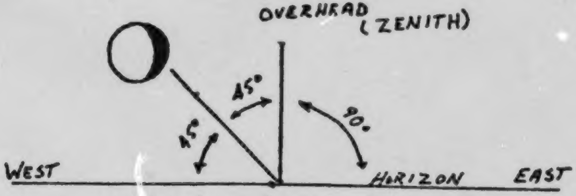
5. A full cycle of waxing and waning takes 28 days, 14 days for each.

To tell time

1st. Estimate the number of days until it will be, or since it has been, a full moon (Facts 3,4,5).
2nd. Multiply that number of days by 50 minutes (or 1 hour if you feel lazy) (Fact 2). This is how much earlier or later the moon rose than a full moon would have risen.
3rd. Figure out at what time the moon will be or was overhead (Facts 1 and 2).
4th. Using your familiarity with telling time by the sun (it travels 15° of arc per hour, as does the moon), estimate how long it will be until, or has been since, the moon is/was directly overhead.
5th. Subtract/add the time from the 4th step from/to the time from the 3rd step to get the present time.

Example I

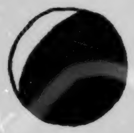
1st. The moon was up before sunset--it's waxing (Fact 3). It looks like this:  Knowing it takes 14 days to go from new to full (Fact 5) you estimate it to be three days until it is full.
2nd. 3 (days) x 50 minutes = 150 minutes = 2 and 1/2 hours.
3rd. The moon rose 2 and 1/2 hours earlier tonight than it would if it were full (Fact 2); hence, it reached a point directly overhead 2 and 1/2 hours earlier than a full moon would reach the same point. Since a full moon would be overhead at midnight (Fact 1), this moon was overhead 2 and 1/2 hours before midnight, or 9:30 a.m.
4th. The moon is at this position in the sky:



so you guess it has been three hours since it was overhead (it travels about 15° an hour).
5th. You add the time from the 4th step to the time from the 3rd step: 9:30 p.m. + 3 hours = 12:30 a.m.

Example 2

1st. "It was darker than a thousand midnights down on the Cypress Swamp while you were bushwhacking up Pond Ridge. Now the moon is up, you are cooking dinner and wondering what time it is." The moon is waning (Fact 4). It looks like this:

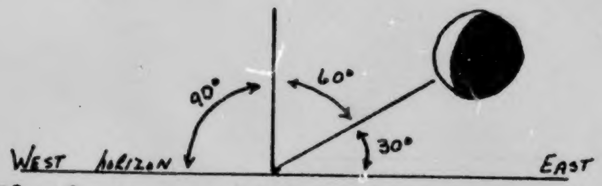


You figure in 3 days it will be a new moon, so it has been 11 days since it was full (Fact 5).

2nd. 11 days x 50 minutes = 550 minutes = 9 hours, 10 minutes.

3rd. The moon rose 9 hours and 10 minutes later than a full moon would have, or at 9:10 a.m.

4th. The moon is at this position in the sky:



At 15° of arc per hour, you estimate it will be 4 hours until the moon is overhead.

5th. It is thus 4 hours before 9:10 a.m. 9:10 a.m. - 4 hours = 5:10 a.m.

"You should be having breakfast, not dinner!"

Story line, and in fact entire explanation, courtesy of John Logsdon.

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## ☐ ENVIRONMENTAL CONCERNS

## BACKWOODS ETHICS CODE

Wilderness areas in many parts of the world are suffering from overuse, misuse, and abuse. Western North Carolina is unfortunately no exception. Overuse might be controlled through designation of more and larger wilderness areas or through permit systems, but misuse and abuse can only be dealt with through education. We at NCOBS are in a unique position not only to care for our natural environment, but also to teach large numbers of folks how to care for their home environments once they leave us. In addition to following the guidelines in this section, you can tell your crews about the Wilderness Act (see p.80 ) and the Wild and Scenic Rivers Act (see p.33), instill in them a consideration for other folks' needs for wilderness, and encourage them to write their congresswomen about environmental concerns.

> "We don't go to the woods to rough it. We go to smooth it. We get it rough enough at home."
> Anonymous

### Fires

Wood fires should only be made where there is plenty of wood and where decay is evident. Dead and decaying wood is needed to build nutritive soil for vegetation and to prevent erosion; this in turn provides for animal life. Therefore, wood fires should be considered a luxury which can be afforded only under ideal conditions; these might exist in a seldom-used area where dead wood is abundant. Where an existing permanent fire pit is available, consider the amount of wood available before building a fire. Chances are that if there is a permanent fire scar in a popular campsite, most of the deadfall will already have been used. During winter courses, you should teach fire-building as a cold weather skill, and in rare cases it may be necessary to build one as an emergency measure. In general, though, you should plan on not being able to have a wood fire; carry a stove and know how to operate it safely.

Site selection: Pick a site away from trees, brush, and overhanging branches or boulders. This will prevent damage to branch and root systems and the irreversible and unsightly scorching of boulders and rocks. Avoid fires against reflector rocks; they will cause permanent scarring of the rocks and exfoliation.

Site preparation: Gently remove all vegetation, including root systems, and clear an area several times larger than the proposed fire of forest litter and duff. The vegetation, litter, and duff should be placed in a defined area, away from the center of activity, for later replacement. If the plant matter is to be out of place more than 24 hours, water it occasionally. Continue clearing down to the mineral soil. Teach the difference between forest litter, duff, and mineral soil; by recognizing this difference, students will better be able to judge the placement of fires for minimum hazard and impact. Do not rim the fire area with rocks, unless you are willing to scrub them off afterwards.

An alternate method is to spread several inches of mineral soil on a flat rock or on several rocks to make a flat area; build a fire on top of this. This mineral soil prevents the rocks from being scarred.

Fuel collection: Take firewood first from loose branches and sticks on the ground, only secondly from downed trees. Don't take any limbs or branches from living trees, whether or not the branches appear dead. Often it is difficult to tell dead from living branches, and snapping twigs and branches from standing trees exposes these trees to damaging insects. Similarly, take no wood from dead standing trees (squaw wood); this results in unsightly scars and an unnatural appearance. Do not use axes or saws on trees.

Safety: Make sure your fire is always attended, and dousing materials are always handy in case the fire gets out of control. Keep a small fire and sit close to it, rather than building a big bonfire.

Clean-up: Make an effort to burn all wood completely. Any partially burned wood should be doused and then widely scattered. Water waste (such as dishwater or cooking water) may be poured along the perimeter of the fire; this helps to prevent damage to nearby grass, roots, and other vegetation. Scatter ashes when they have cooled. Then replace the litter, duff, and plants that you originally removed.

REMEMBER! WHEN YOU LEAVE THERE SHOULD BE NO EVIDENCE THAT YOU WERE EVER IN THE AREA.

Fire policy in solo areas: Discourage fires to avoid "soot holes" and to lessen the impact on solo areas, which are used over and over again. If students must have a fire, as on winter courses or for preparation of hot drinks, it may be only a very small (6" diameter) twig fire, and then only after they have been carefully instructed in fire building. A good policy would be to limit the size of their fire wood to sticks no larger in diameter than their fingers.

How to build a fire in the rain: Occasionally it becomes necessary to get a fire going when all the wood seems wet and the rain is still pouring down. Several times in the past, hurricanes coming up the coast have caused 2 or 3 days of non-stop rain. This might be one of those emergency situations in which a fire is justified.

Lighting: 1. Find some sort of shelter under which to start the fire. A large overhang is ideal; otherwise, pitch a tarp about 6' high.

2. Gather large amounts of fine twigs, finger-diameter kindling, and larger limbs, and strip off the wet bark.

3. Try to find resin (pine sap) that may have oozed out from an old scar; this is an excellent starter. Pine knots are also a good source of resin; look for them at the bases of limbs in dead pine trees on the ground.

4. Ancient chestnut wood will be dry under the surface.

5. A sheath knife may be used to split kindling if pounded with an improvised mallet.

Use: 1. Don't spend so much time being overjoyed that you started it that you neglect to maintain it. Used good, peeled logs, and remove the tarp only when the size of the fire becomes a hazard to it.

2. Keep a close eye on students and their equipment as they attempt to dry it out; excessive zeal is common and often results in tragedy for socks, mittens, sleeping bags, etc. Remember that nylon has a low melting point.

## Camp Sanitation

Latrines are shallow pits or trenches into which human solid waste is deposited. They are dug no deeper than 18 inches, depending upon the depth of the humus or duff. Waste must be far enough below the surface that animals will not dig it up and yet high enough above mineral soil so that it can decompose and not leach out. This allows bacteria and oxygen quickly to decompose the waste, while it is hidden from human view and protected from insects. After each use, the waste is covered, landscaped, and compressed with the user's foot. If the user is bothered by using her foot, she hasn't done an adequate job of covering up.

A latrine should be located off trails and away from camps, on sloping ground if possible. Most importantly, it should be away from surface water sources. While a location a good distance from camp should provide for natural privacy, whistling or singing while using the latrine will ensure privacy. Having a latrine far from the center of camp will also ensure that popular camps don't become crowded with former latrines, which could lessen their popularity.

If you use toilet paper, burn it after use (unless the woods are so dry that this would be a fire hazard). The use of toilet paper is encouraged at NCOBS for hygienic reasons: people are usually able to do a better job with toilet paper than with leaves. Snow is a similarly salutary wiping material.

Encourage people to wash their hands with soap and water after using the latrine.

Urinating is also done off the trail and away from water sources, preferably in an area with a thick humus later. This will hasten decay, absorb the liquid, and avoid quick run-off. Avoid areas where runoff into streams will take less than 2 hours. It takes about this long for the nitrogen in urine to oxidize; this is a good measure of the complete treatment of the waste.

Soap: Don't use soap in lakes or streams. Clean clothes, hands, dishes, etc. in cooking pots away from a water source. Bathe yourself by first dipping in the water, then lathering on shore far away from the water, and rinsing off completely by pouring cans of water over your body. This allows the soap to be filtered by the soil and to degrade quickly. Use biodegradable soap only.

Garbage: Plastic, paper, tampons, and food waste may be burned if you have a fire; otherwise carry them out. Plastic, paper, and tampons go in the burnable waste at camp; food waste goes in the compost. Cans, bottles, and tin foil should be carried out and put in the appropriate recycling bins at base camp. Waste water should be poured in a sump hole; fill this in when you leave camp. DON'T BURY ANYTHING--animals will dig it up.

Encourage crews to collect as much litter as they can carry, and leave it at the nearest roadhead with one of the school litter tags attached. The tags read: "This trash was picked up in the woods by the staff and students of the North Carolina Outward Bound School and we don't have room for it in our packs. Would you please take it to the nearest dump? Thank you. NCOBS"

Campsite Locations

Beauty spots: Don't locate your camp in a beauty spot, such as a lush meadow or the edge of a large rock outcrop, lake, or stream. These areas are usually susceptible to damage because they contain delicate soils and plant life which would not easily recover from the impact of a camp. Camping adjacent to water sources cuts them off from wild animals, who are afraid to come in for water while you are there, and may even stay away for days after you have left.

Groups of campers: Avoid camping with other groups. If you must camp near others, choose your site so that the terrain forms at least a partial barrier. This will ensure privacy, cut down on noise, and help keep the area from being overused.

Overused Campsites

An overused or poorly concealed campsite has at least some of these characteristics:

- partially burned wood in evidence
- scorched rocks and trees
- broken branches within an arm's reach of the ground (no squaw wood)
- fire areas in evidence
- exposed mineral soil and areas bared of forest litter and duff.
- trampled and/or dead ground vegetation
- broken bottles, flip tops, beer cans, and potato chip bags

All of these things lead to degradation and spoilage, but an overused campsite can be revitalized and restored, at least partially, to its natural condition (this would be an excellent service project). To clean up and camouflage an overused campsite:

- Burn all partially burned wood and scatter its ashes when there is no heat left in them.

- Clean all scorched rocks and boulders with biodegradable soap and a brush; then scatter them (at least the rocks).
- Replace all forest litter and duff at denuded places.
- Tear down all man-made appurtenances; scatter logs and beams; carry out all synthetic materials.
- Make safe those areas where previous campers have taken squaw wood and left sharp branch stumps on which to gouge their eyes and otherwise skewer themselves. Cut the stumps off flat with the tree and treat the scar, using either commercial tree paint or mud.
- Carry out the broken bottles, flip tops, beer cans, and potato chip bags.

Parks and campgrounds are areas where even more effort is needed to preserve the natural effect. In addition to the efforts listed above, it will be necessary to:

- Import or manufacture litter and duff to recover those areas where the mineral soil is exposed. You might shred the partially burned wood if you have a shredder available.
- When distributing forest litter and duff, you may need to construct erosion barriers to keep the material from washing away.
- Restore natural plant life in denuded areas. This could be discussed with a neighborhood government expert on the matter.
- Encourage users of the property to spend time restoring the area as a service project.

To manufacture litter and duff, you may:

- Collect leaves and natural debris from yards and streets; then chop them up (if you use a lawn mower, feed only leaves into it).
- Shred branches and dead trees collected by a municipality.
- Use material from thatched lawns, salt hay, cornstalks, etc.

The material will shortly decompose and be unnoticeable anyway, but if you want it to look more natural:

- Hide it with a covering layer of native material.
- Chop the material up more.
- Work the material into the soil with hand tools or a rototiller.

## Minimum Impact on Other Users of the Backcountry

Most backcountry users expect to have solitude during their visit. An encounter with an OB group of 12-14 people is not necessarily an agreeable part of their experience. Large groups tend to be more offensive than small ones, and a study has shown that encounters near campsites or deep in the woods disturb others' experience more than encounters on trails or near roadheads. While we cannot control where we run into folks, we use these policies and practices:

- Plan routes to avoid heavily traveled trails and heavily used areas.
- Avoid having two groups traveling in close proximity. Travel and camp a mile or more apart (see p. 105 ).
- Make sure your group's state of dress or cleanliness won't offend others.
- If the folks you meet appear interested, explain the purpose of the OB group's visit. Offer a brochure.
- Avoid popular areas on weekends: Mt. Mitchell, Table Rock, fishing creeks, Cape Sable, Worley's Cave, etc.
- Give others' campsites a wide clearance when traveling.
- Do not plan expeditions which use long sections of the Appalachian Trail. Use it only as a connector.
- Never stay in a trail shelter along the AT. They are for "end-to-enders".
- Keep a tidy campsite. Don't leave equipment, food, or litter strewn about.
- If you do camp close to other folks, give them as much privacy as possible.
- Always wear a swimsuit while swimming; nudity offends a lot of people.
- Remember that your appearance and actions represent the whole school.

## Minimum Physical Impact on the Backcountry

One of OB's aims is to give each student an understanding of the importance of wild areas and of their fragility. We expect each student to develop a personal commitment to minimize the physical impact of her visit to the backcountry.

In addition to adhering to the previous camping rules, use the following travel procedures:

- Use existing trails when available; do not cause erosion by cutting off switchbacks.
- If a section of a trial is muddy, consider making a drainage improvement rather than bypassing the

muddy sections and creating a new trail.
- When bushwhacking or traveling crosscountry, leave no markers, cairns, or blazes. Allow others the same pleasure in navigating trailless country that you had!
- Travel quietly; avoid clanging pots and cups hanging from packs. The noise will lessen the chances of seeing wildlife and disturb others.
- Take no souvenirs: flowers, rocks, bones, etc. Leave these for others to enjoy.
- Observe animals and birds from a distance. Respect their need for undisturbed territory.
- Dogs and other pets must not accompany groups. They may disturb wildlife and their noise may offend others.
- Pick up litter you find along the trail. Keep one pocket just for trash.
- Consider clearing brush from an overgrown trail or repairing deteriorating tread. If extensive, note for a future service project.
- When passing horses on a trail, step off the trail and stand quietly until the animals have passed. Horses have the right-of-way.

## The Art of Bushwhacking or Off-Trail Hiking

The term "bushwhacking" has an awful connotation; it sounds as though bushes are the enemy which must be subdued with a machete to make a trail. The term "off-trail hiking" is preferable and far less violent.

Every OB course should include a hellacious bushwhack through an impenetrable rhododendron thicket. Add a downpour on a steep hill with heavy packs at the end of a long day and you'll probably get some good group interaction. But the success of the bushwhack often depends on the attitudes instilled by the instructors. As safety briefings are necessary for rocks, ropes, and rivers, so should they be for "off-trail hiking".

- Caution crew against jabbing their eyeballs out on a limb and being slapped in the face by a branch for following too closely.
- Move slowly and deliberately at well-spaced intervals.
- Choose routes that offer the least resistance by constantly looking for openings ahead.
- Part limbs with your arms and shoulders instead of heaving body and pack against horizontal limbs, which are more difficult to pass.

- Avoid breaking off limbs. Some bushwhacks are used more than once, and you rob others of the feeling of wilderness if they know people have been there before. Broken limbs are also dangerous.
- Emphasize to the crew to leave as few signs of their passing as possible. The same is true for walking through delicate fern or flower areas.

"Goin' up, you can might nigh stand up straight & bite the ground; goin' down, a man wants hobnails in the seat of his pants." (local saying)

## CAVE ETHICS

Since our winter programs include camping in caves, it's important for crews to follow these guidelines to keep NCOBS' impact at a minimum.

- Do not touch any cave formations (speleothems); the oil on your hands will affect their growth.
- Do not remove any speleothems, even if they are already broken.
- Do not dump any carbide in the cave or around the entrance. It is poisonous to cattle. Bring it back to the school for disposal. Add water to the bag it is in to complete the chemical reaction; then dump it in trash cans.
- Do not collect any plant or animal life.
- Do not mark cave walls with signs or arrows. Feel free to remove any unnatural or non-historical graffiti from the cave walls by blotting it out with mud (This might be a good project on the way out after the crew has developed an appreciation of the cave).
- Bring a few extra burlap sacks for carrying out litter. Set an example and encourage students to bring out anything unnatural.
- Human waste will decompose very slowly, if at all, in the cave, so carry out all fecal matter in a 10-gallon bucket (honey bucket) lined with 2 heavy-duty garbage can liners. The bucket serves as a toilet while the crew is in the cave. Put only fecal matter and toilet paper into it. It has a lid which forms a tight seal for transport out of the cave. Bring the fecal matter back to the school and dump it into the sewage treatment plant (this job is more pleasant if you let the stuff freeze first). Urinate into the stream or onto the mud above

it where urine can run off into it. Urinating in the dry part of the cave should be avoided, as it creates an unpleasant odor that takes some time to dissipate.

- It is important that the food area is kept clean, as mold will grow on any leftover food residue. Use an extra ground cloth as a table cloth to collect the food spills which are bound to happen. Wash cooking pots and utensils in the stream upstream of the urinating area. Sterilize all utensils and pots, as the stream may be polluted.

## SPECIAL CONSIDERATIONS FOR WINTER

In the winter, it can be impossible to find soft ground for a latrine, so latrines must be dug in snow. Site considerations are the same as for summer latrines, with the additional necessity of locating the latrine in an area of as much snow as possible. As the snow melts, the feces have a chance to decay, wash away, and filter through the soil; the more snow there is in the latrine area, the more effective the spring decay. There is no reason for a crew's waste to be deposited en masse. Since digging winter latrines is easy, most instructors have their students make personal holes as needed. Snow should be kicked over urine stains to prevent the "yellow snow" effect. Do this far from camp so that bad snow isn't scooped up for melting!

Camp sites should be selected away from trails and bodies of water. All snow kitchens should be filled in, so that after a 2-3 inch snowfall, a campsite is undetectable. Cover any accidental stains on the snow. Dig a sumphole in the snow for dishwater to prevent unsightly stains on the snow.

Litter is especially difficult to check in the winter, when dropped items can be lost in the snow, so it demands special attention. Keep a careful eye on food wrappers, twist-ties and the like. Candle wax can be caught in a cup and then put in a litter bag.

## THE LITTER THAT LINGERS

These figures come from Outside magazine, which asked a waste-disposal expert to estimate how long it would take some common materials and objects to degrade past recognition under trailside conditions. The times will vary, of course, according to climate and other factors. Generally shorter times apply for conditions of direct sunlight; longer times for shady environments. If you leave some of the items listed below behind in the wilderness, this is how long they'll stay around for the other folks to look at (unless some OB crew comes along and picks them up!).

Alumninum cans and flip-top tabs: 80 to 100 years (longer if submerged in fresh water).
Vibram sole: 50 to 80 years.
Plastic Clorox-type containers: 50 to 80 years minimum.
Leather: up to 50 years for a crew.
Nylon fabrics, including ripstop: 30 to 40 years.
Plastic film: 20 to 30 years.
Plastic bags: 10 to 20 years.
Polyurethane: 10 to 30 years.
Milk cartons or other paper containers with plastic coating: 5 years.
Wool socks: 1 to 5 years.
Human body: 1 to 3 months.
Paper containers: 2 weeks to 5 months.
Fecal matter: 1 to 4 weeks.
Orange peels: 1 week to 6 months.
Plutonium-239: Its half-life is 24,390 years.

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## ☐ WEATHER

The key to successful forecasting is to base your predictions on several indicators instead of just one. This section will provide you with basic information about wind, pressure systems, and frontal and cloud progressions, which in combination will enable you to make basic weather predictions.

### WIND

Weather generally travels from the west at about 500 miles a day, traveling on the prevailing westerly winds. A look at the sunset in the west, then, will give you clues about the weather to come:

Red sky at morning, sailors take warning.
Red sky at night, sailor's delight.

The sun is setting through tomorrow's weather; dry air refracts red light. Wet air and rain on the way will cause a yellow or gray sunset.

Rainbow in the morning is a warning, at night,
a delight.

Rainbows are caused by the sun striking the wet clouds. They shine opposite the sun. An evening rainbow in the east is shining through weather already past; a western morning rainbow highlights wet weather yet to come.

If the wind is not out of the west, other winds will bring other weather, as shown in the chart below. With rain coming, aspen and maple leaves will show their undersides to the wind bringing it.

| Wind Direction | Pressure | Weather |
|---|---|---|
| E to N | Low, falling fast | Severe gale, rain |
| E to N | Low but rising | Cold wave |
| S to E | Falling | Storm, clearing in 24 hours |
| S to SW | Rising | Clear soon, several good days ahead |
| SE to NE | Falling | Rain for 1 or 2 days |
| E to NE | Falling | Rain in 24 hours |
| S to SE | Falling | Wind, rain in 18 hours |
| SW to NW | Steady | Fair for 2 days |
| SW to NW | Rising fast | Fair, rain in 2 days |
| Going to West | Rising | Clearing, colder |

## BAROMETRIC PRESSURE

This is the pressure of the weight of the air on the earth's surface. Since wet air is lighter than dry air, wet weather is associated with low pressure systems, and fair weather is with high pressures. Lacking a barometer, here are some signs of low or dropping air pressure:

- Birds are not flying or flying low. (Low pressure, thinner air, is hard to fly in).
- Smoke curls downward and lingers.
- "When ditch and pond offend the nose, look for rain and storm blows." Smells are very distinct because the low pressure is allowing captive odors to release --a patch of galax smells very strong before a storm.

## FRONTS

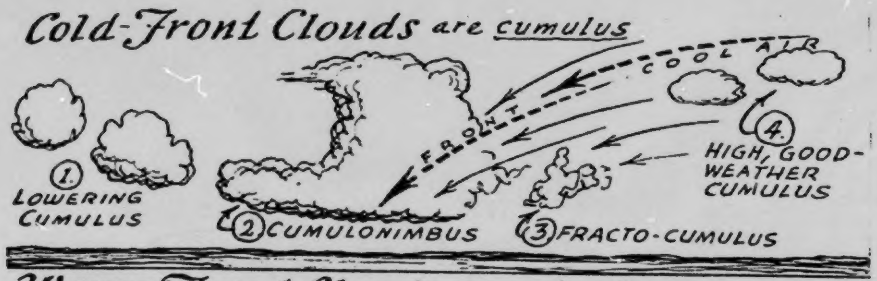
A front is the wall of an advancing air mass.

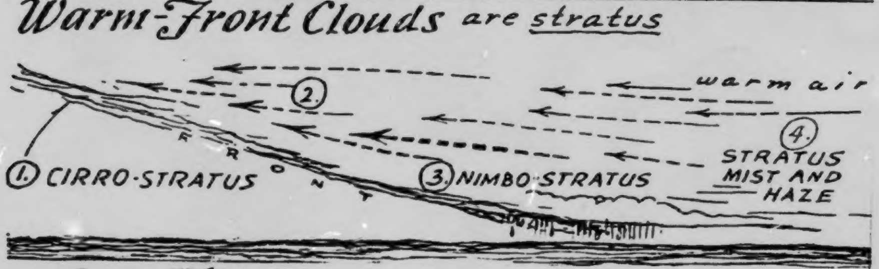
A warm front usually covers 800 miles or more and slants forward. It moves very slowly, providing a long warning (24 -48 hours) of rains to come. However, rains will last long--maybe days. Warm fronts are indicated by thin high wispy cirrus clouds, lowering over a period of 1 to 2 days into sheets or a veil-like covering. This cloud cover will continue to lower and darken, resulting in precipitation.

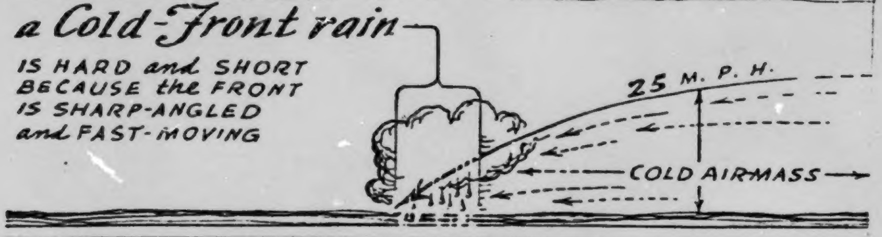
When you see a mackerel sky, expect rain within a day. The clouds of the mackerel sky are part of an advancing warm front.

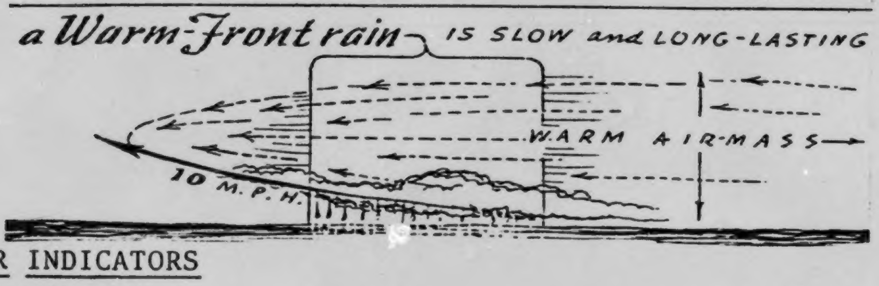
A look at the night sky might provide early warning of a coming warm front. A halo around the moon is caused by forming cirrus clouds--the first sign of a warm front. These irregularities may also be indicated by twinkling stars.

Cold fronts cover 100 miles or less, slant backward and move much more quickly. They bring little warning, a fast, hard rain, and leave clear, dry, cold air behind them. Moving at 20-30 miles an hour, they begin with high cotton clouds, which will lower to form layers of strato-cumulus clouds, bringing rain.


Cold-Front Clouds are cumulus
COOL AIR
FRONT
① LOWERING CUMULUS
② CUMULONIMBUS
③ FRACTO-CUMULUS
④ HIGH, GOOD-WEATHER CUMULUS


Warm-Front Clouds are stratus
warm air
②
FRONT
① CIRRO-STRATUS
③ NIMBO-STRATUS
④ STRATUS MIST AND HAZE


a Cold-Front rain
IS HARD and SHORT BECAUSE the FRONT IS SHARP-ANGLED and FAST-MOVING
25 M.P.H.
COLD AIRMASS


a Warm-Front rain
IS SLOW and LONG-LASTING
WARM AIRMASS
10 M.P.H.

OTHER INDICATORS

Dew is a sign of fair morrow. On a clear night, without cloud particles, moisture releases itself from air and collects as dew. No dew at night, rain by morning. No dew at morning, rain by the next day.

Fog at morning is simply damp air condensed by the cold of the night. It will burn off with the heat of the morning. Fog at night or late in afternoon is more often the result of cold rain or snow falling through warm air on which it condenses; this indicates a coming storm.

Animal sounds: woodpeckers and bluejays are always very noisy before a storm. Insects stop making noise.

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Temperature: Rhododendrons are thermometers:

At 20°, the leaves are tightly curled.
At 30°, the leaves are curled.
At 40°, the leaves are drooped.
At 60°, the leaves are spread out.

Or you can tell the temperature by listening to crickets:

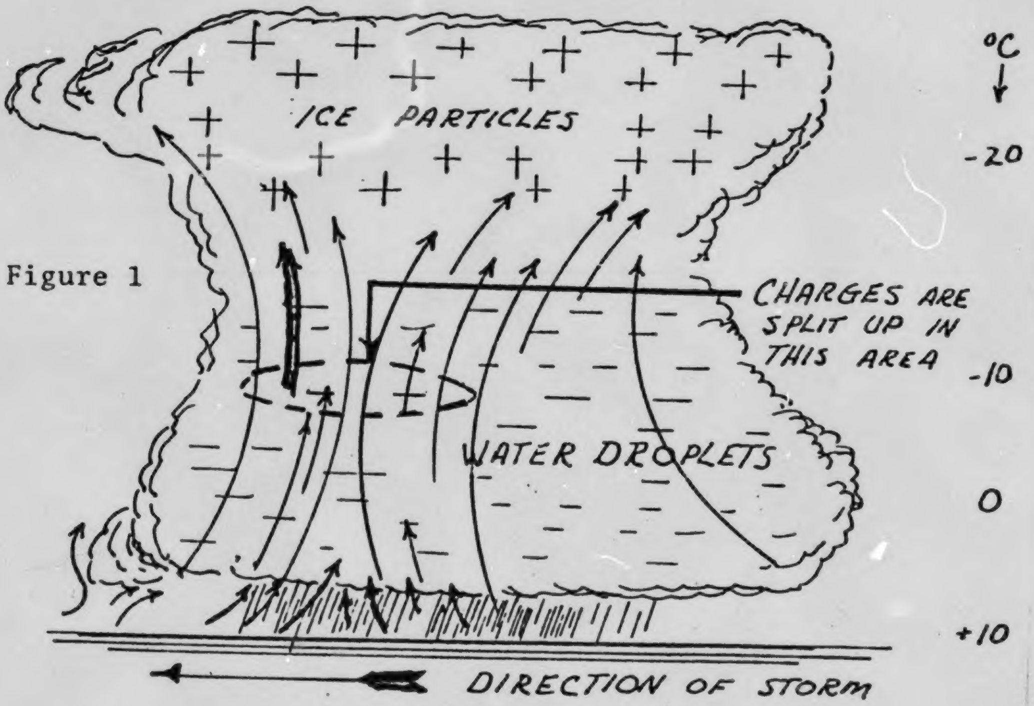
1. Count the number of chirps per minute.
2. Subtract 40.
3. Divide the result by 4.
4. Add 50, and you'll have the temperature in degrees.

## Lightning

Our program areas and activities repeatedly place our participants in areas of likely lightning discharge. This demands that instructors and crews alike have a basic understanding of lightning and how to avoid it.

Physics of lightning: Warm, moist air, when thrown aloft into cold heights by violent updrafts, will slowly overcharge, then discharge with an instantaneious "BANG". The violent updrafts repeatedly break raindrops into smaller drops; each time this occurs, their negative and positive charges are seperated. The negatively charged air molecules rise on the updrafts, while the positive and neutral water molecules are heavier and remain below. By repeated splitting of the drops, enormous electrical charges are made available within the cloud (See Figure 1).

Figure 1



Air is normally a good insulator (poor conductor), but in the presence of these large electrical charge differences air molecules will conduct electrical currents quite well. The lightning "flash" is the flow of these seperated positive and negative charges back together again along ionized air.

Figure 2 illustrates the possible types and probable occurences of this lightning discharge.

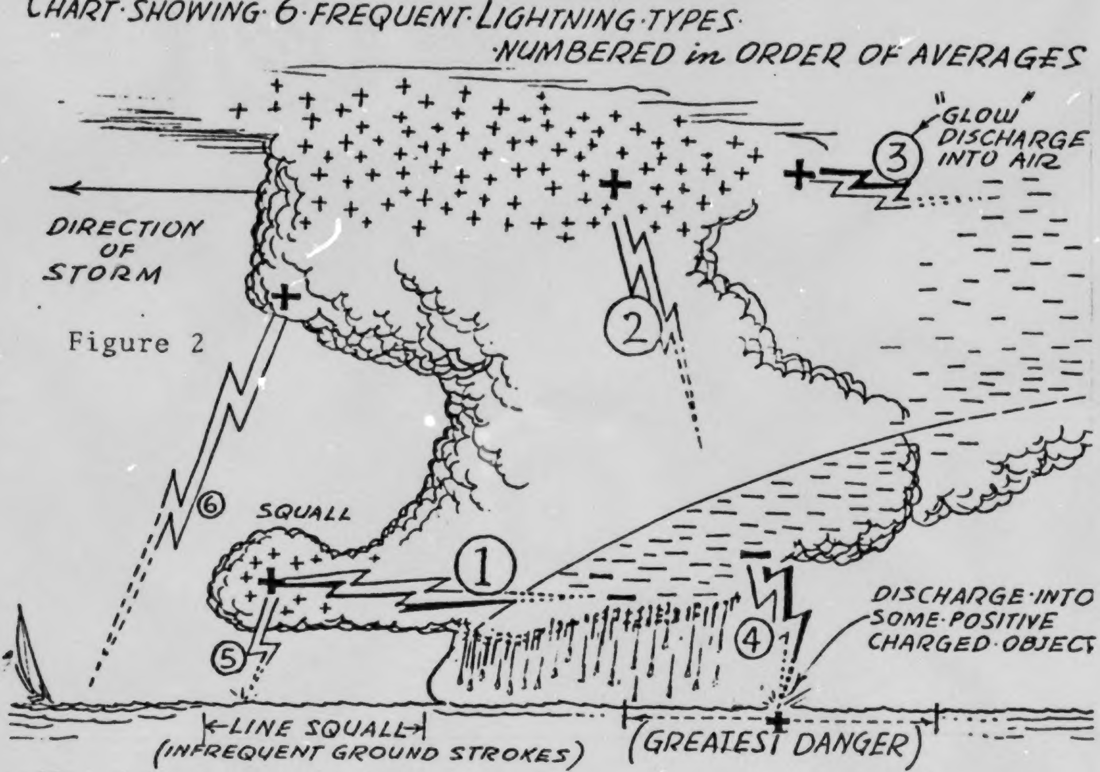

CHART·SHOWING·6·FREQUENT·LIGHTNING·TYPES·
·NUMBERED in ORDER OF AVERAGES
"GLOW" DISCHARGE INTO AIR
3
DIRECTION OF STORM
2
6
SQUALL
1
5
4
DISCHARGE·INTO SOME·POSITIVE CHARGED·OBJECT
LINE SQUALL
(INFREQUENT GROUND STROKES)
(GREATEST DANGER)

Figure 2

We are concerned with the cloud to earth type of discharge as illustrated by #4, Figure 2. The primary dangers associated with this discharge are a direct hit and ground current.

Dangers from direct hit: The potential electrical charge differences are greatest near high and relatively sharp points: mountain summits, sharp ridges, minor summits or pinnacles at the end of a ridge, and trees or standing persons.

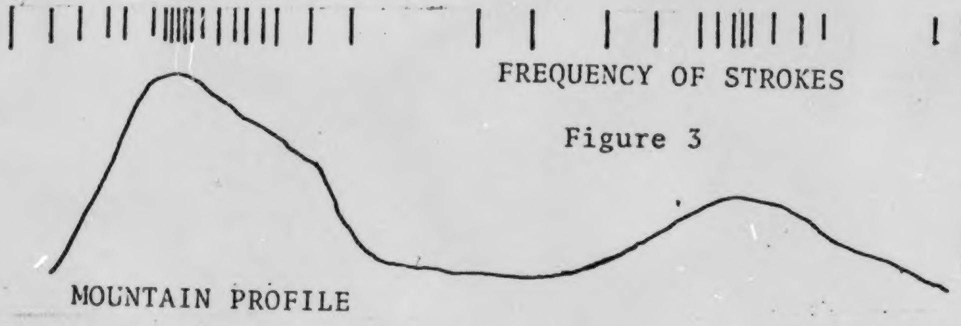

FREQUENCY OF STROKES
MOUNTAIN PROFILE

Figure 3

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Protection: The best idea is to be completely out of the area of likely direct hit (i.e. off the mountain, ridge, etc.) but this is not always possible. If caught in an area where a lightning strike seems possible, take advantage of the presence of a nearby pinnacle or likely spot of direct hit. Lightning will tend to hit the pinnacle rather than the person near it, if the pinnacle is 5 to 10 times or more the height of the person and the horizontal distance from the person to the pinnacle is about half the pinnacle height (Figures 4 and 6).

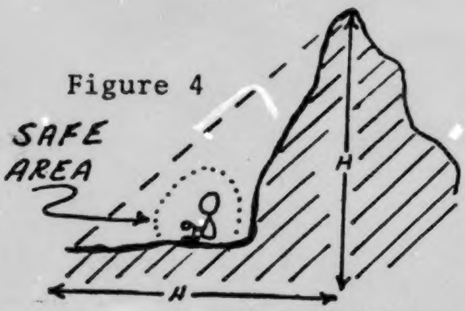


Figure 4

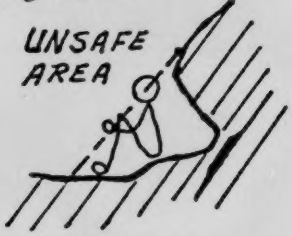


Figure 5

BUT - If the potential victim gets too close under the peak, her body may be an alternate path to that of the ground for the very strong ground currents (Figures 5 and 6).

OR - If the person moves far from under the pinnacle (more than its height) the direct hit might just as likely strike the person as the pinnacle (Figure 6).

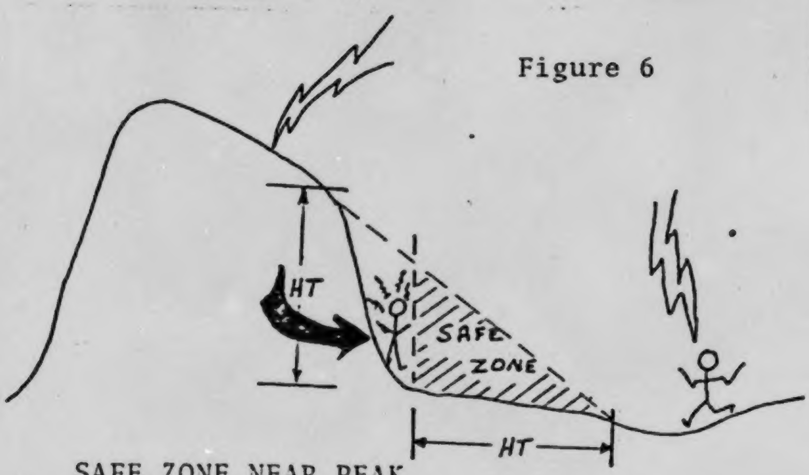


Figure 6

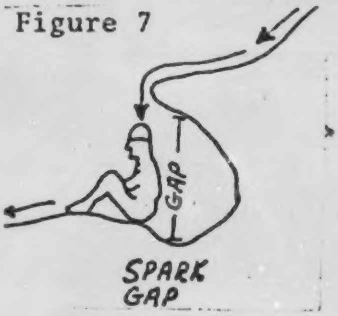
SAFE ZONE NEAR PEAK

If the crew is in an area of high lightning danger, individuals should not wait out the storm huddled together. The survival of one person whose heart or breathing has stopped may depend on prompt action by companions. It is quite unlikely that all of a group of seperated persons will be knocked unconscious simultaneously.

Danger from ground current: The current which flows in a lightning bolt does not dissipate itself at the point of the direct hit; it tends to flow along the easiest paths of electrical conduction on the surface of the earth. These may include wet, lichen-covered rock, cracks and crevices filled with water, natural fissures and chimneys, wet ropes, cables and the like along the ground, and "spark gap" areas. When the ground current takes a short straight path through the air, rather than a longer path around through the ground, this is known as the "spark gap" effect (Figure 7).

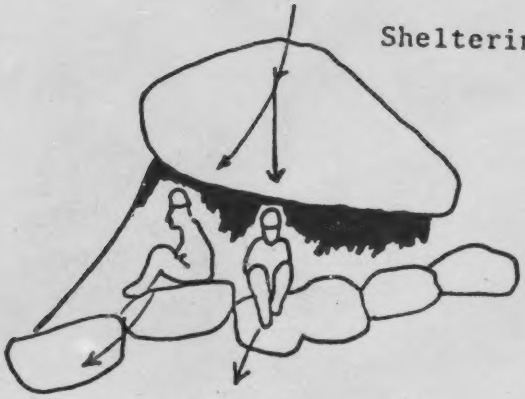
Protection: The natural inclination in a heavy storm is to seek shelter, especially if rain is driving down. Unfortunately, this is the wrong thing to do unless you can find a dry cave which gives you at least 10' head room and 4' to either side. However, such caves and hollows are often local expansions of cracks and fissures, which are likely conduits for ground currents, especially if they hold water. By sheltering in them, you are offering yourself as an alternate "easy" path for the spark gap (Figure 7). So even a cave of adequate dimensions is highly suspect as a safe area; it should be used only if it is best of available options. The same argument applies to sheltering under large boulders (Figure 8).

Figure 7



With reasonable waterproof equipment, remaining dry for the short duration of a storm should not be a major problem. It is much safer to sit it out in the open, crouching to minimize the distances from one body part to another. The feet should be close together and the hands kept off the ground. Crouch on dry insulating material if possible (See Figure 9).

Figure 8


Sheltering under large boulders

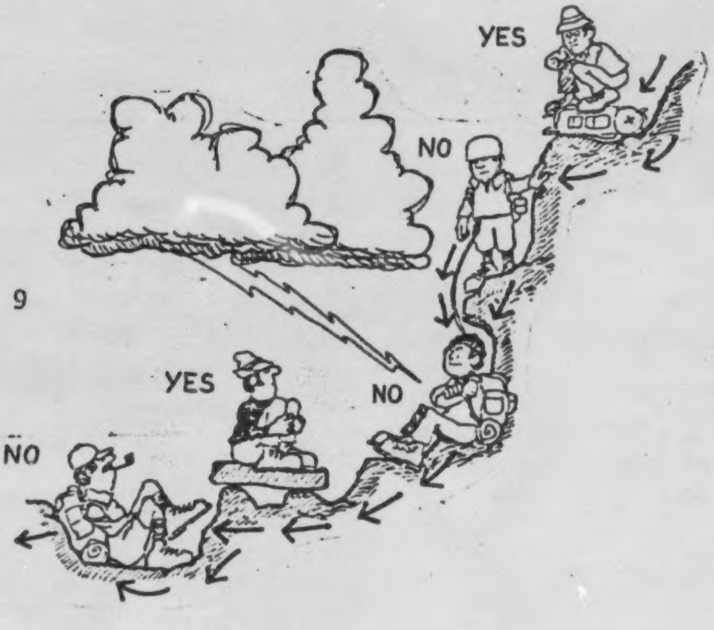


Figure 9

YES
NO
YES
NO
NO

Special hazards: climbing: Rappelling when lightning is imminent should be avoided. A large current could be passed along the ropes from the anchor into the body. Even a minor shock could be indirectly fatal, if it caused the rappeller to fall out of her rappel. It may be a valid calculated risk if it speeds descent and escape from a "danger zone", but only if the hazards of remaining would be greater than those of rappelling.

A climber may find herself "exposed" in the climbing sense of the word, yet at the same time moderately safe from lightning hazard. She could still experience a minor shock that would cause a fall, so it may be advisable to tie into an anchor. This tie-in may be a conductor, so it should lie across rather than along possible "easy" paths of ground current. It should not go to a chest sling which would pass current through the climber's heart and spinal cord. When on a ledge, crouch near the outer edge, hopefully at least four feet from the rock wall. Tie-in if necessary using the previously mentioned cautions.

Contrary to popular belief, metal objects (climbing hardware, pack frames, ice axes, etc.) do not attract lightning. In the immediate vicinity of a strike however, metal in contact with the body may present hazards from "induced currents". These currents are quite small, but when added to ground currents may mean the difference between life and death. Thus, it is best to set aside all metals if possible, but to keep them close by. Climbing gear may well be needed later for a retreat after the storm. A metal pack frame or ice axe might be positioned to provide a more attractive path for ground currents beside and past one's body.

Warning signs of lightning: Any or all of the following may indicate the possibility of imminent lightning discharge:

- Crackling noises or buzzing coupled with small sparks given off around metal objects (caused by the ionization or breakdown of air molecules around a potential "target").
- Blueish glow or corona around objects, commonly known as St. Elmo's fire.
- Hair crackling or standing on end.
- Cloudburst of enormous raindrops, monster snowflakes or huge hailstones indicating the overhead presence of a cumulonimbus "thundercloud".
- Sudden rush of cold air indicating a strong cold front associated with possible lightning.

The distance of approaching electrical storms may be calculated by timing the interval between the "flash" and the following thunder. Because sound travels about 1/5 of a mile per second, count the seconds after you see a flash and divide by 5 to find the distance.

*Physiological aspects of a lightning strike*: Electrical currents passing through the body may cause burns, muscle spasms, heart stoppage or fibrilation, brain malfunction, and cessation of breathing. The extent of injury depends on the amplitude and duration of the current and on the path of flow through the body. When a person is struck directly, the current is apt to be so large that the results are fatal no matter what the path through the body. Ground currents are weaker and the particular current path through the body makes a significant difference. For example, current passed from hand to hand will pass through the heart, spinal cord and vital organs, yet the same current from foot to knee of the same leg is not so bad. This is why the crouch is the best position for preventing injury.

### Sources

Ferber, Peggy, ed.: *Mountaineering, The Freedom of the Hills* (Seattle, 1974).

Langmuir, Eric: *Mountain Leadership*

May, W.G.: *Mountain Search and Rescue Techniques* (Boulder, 1973).

Sloane, Eric: *Eric Sloane's Weather Book* (New York, 1952).

# Activities

## ☐ MORE INITIATIVES: ACTIVITIES AND TALKING GAMES

The Instructor's Handbook lists the different initiatives set up at each base camp and several mobile initiatives. Here is a collection of other things to try, culled from various folks' memories and experience and the various other OB schools in this country.

### ACTIVITIES TO BUILD COOPERATION

- Build a sauna of tarps over a lashed stick frame. Be sure you are in an area where you can do this without leaving a trace of your activity, and be careful not to burn anyone!
- Have the crew figure out a way to cross a large creek (one you would usually wade) staying dry.
- Stage a mock search to find lunch.
- Have a trust walk in which the whole crew is blindfolded except the leader, who can't talk. You lead the leader over stumps, under logs, through rhodos, etc.

### Tree activities:

- Pair off, with 1/2 of each pair blindfolded. The seeing student leads the sightless one to a specific tree. The sightless one has 2 minutes to become as familiar with it as she can. Then she is led away, takes off her blindfold, and tries to find her tree.
- Spend a day or a night or cook a meal in a tree.
- Have the crew all climb the same tree as the waters of a flash flood, or a hungry alligator, or some fast-growing poison ivy nips at any part of them less than 6 feet off the ground.
- Have the crew make a chalk mark at the highest point on a tree they collectively can reach.

### Line up in order of:

- Size, each crew member being an animal whose identity you've whispered to her. She can make only the sounds of that animal.
- Height, with all crew members blindfolded and speechless.
- Name, listed alphabetically. Try first names first, then middle, then last, then first again without speaking. Good introductive game.
- Number, which you've whispered to each crew member, while standing on a log and not speaking.

The previous numbered page in the original document was blank.

- Have everyone sit in a circle, blindfolded and speechless, and take off 2 items of clothing (a sock and a shoe, maybe) to put in the center of the circle. Mix up all the clothes. Then everyone must find her own clothing and get someone else to put it back on her.
- Have the crew form a polygon, such as a square, right triangle, isoceles triangle, with their expedition rope, while blindfolded.

-- These activities must be carefully supervised to make sure they are safe. Many will require spotters, and sometimes you will have to call off attempts that could knock out a few teeth or break an arm.

Variations:

Many of these activities can be done with any number of variations as follows:

- Do it silently.
- Do it speaking only a foreign language--try out your high school French, for example.
- Do it blindfolded.
- Do it carrying a pot full of radioactive water from Three Mile Island.
- Do it with a time limit.
- Do it with mittens on.
- Do it with everyone's thumbs taped to their hands.

-- These variations can make everyday tasks into initiatives, too: break camp and start hiking silently, or with mittens on, or set up tarps blindfolded. Another good variation is: don't do it for yourself--someone else has to feed you, pack your pack, put on your boots, etc.

## TALKING GAMES

Talking games are essentially forms for discussions or means of getting them started.

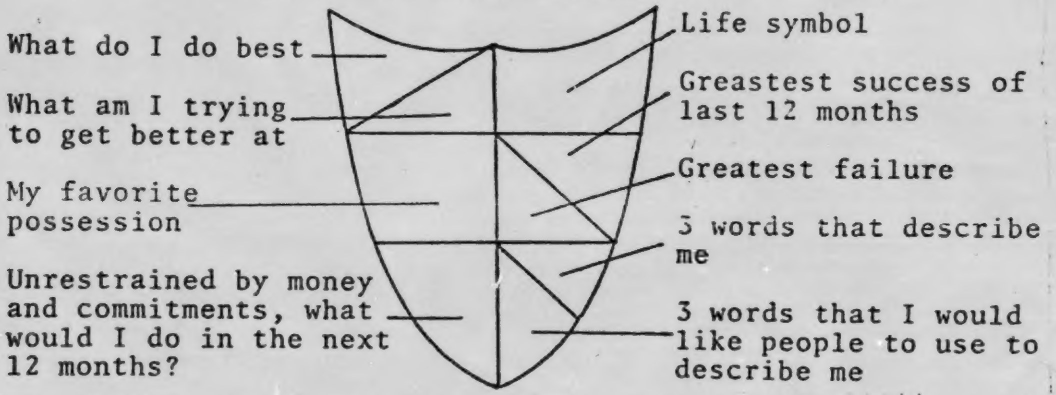
To help evaluate a day or activity:

- Keep a crew journal. Have the writer for the day read her entry each evening.
- Ask the crew to decide on one word that describes the day or let each person have one word.
- Have a "Rite of Passage"; formally turn over the responsibility for leadership to the crew at the beginning of Main, for example.
- Ask the crew to make up a song, poem, or skit a-

bout their experience. Each person could add a rhyming line to a poem.

To help students look at themselves:

- Ask each student to say one thing she likes and one thing she dislikes about herself.
- Have each student draw a shield:


What do I do best
What am I trying to get better at
My favorite possession
Unrestrained by money and commitments, what would I do in the next 12 months?
Life symbol
Greastest success of last 12 months
Greatest failure
3 words that describe me
3 words that I would like people to use to describe me

To help students understand their roles in the group:

- Have students write down a fear thay have about the course (or whatever). Put the "fears" in a hat, shuffle them, and pass them back out. Have each person role-play the fear she receives.
- Present a situation such as "Our crew is caving when a landslide starts to block the entrance. We have time for 7 people to get out. Who will get out?".
- Present a situation where everyone is trapped, marooned, doomed, etc. Write 12 role-types on slips of paper (e.g."Comforting Carl - you want peace in the group and will do anything to maintain it" or "Linda Leadership - you are the organizer, recruiter, doer of the group") and pass them in a hat. Each student is to role play the type she draws and together the crew must "solve" their situation.
- Draw a large circle on the ground. Have each student place her shoes (or herself) in a position in the circle which fits her role in the group. Have each one explain the positioning and ask if she'd like to change it. Ask other crew members if they think the positioning is correct.

To help students understand how they are seen by others:

- Have each person choose 3 volunteers to speak on her behalf; then let the whole group affirm them (a Cheyenne initiation rite from COBS).

- Have each person request a strike (constructive criticism) from another crew member and then a stroke (praise).
- Hot seat--each person has a turn at receiving whatever feedback the crew is ready to give.
- Have the crew members role-play one another--they might draw names from a hat.

-- In conducting these games, be sure to be sensitive to when the game is played out and it's time to call a halt. The last two, in particular, should be tried only with a crew that you know to be reasonably sensitive and compassionate. Afterwards, talk about the games--how new roles felt, what folks learned, what was frustrating, what was great.

## THINGS TO TRY WITH OTHER CREWS

- Have a potluck dinner.
- Have a monster race. Each crew must form into a unified monster, with no more than 1/3 its total legs (and any number of hands) on the ground. A monster that falls apart in mid-race must re-assemble before continuing.
- Play hug tag. IT can't get you if you're hugging someone, but you can't hug for more than 3 seconds at a time.
- Play "people-to-people". IT yells out "nose-to-elbow", "knee-to-navel" and one or two other similar connections that you must make with your partner. Then IT calls "people-to-people" and you must find a new partner. If you don't you're IT.
- Have your crew invent an initiative for the other crew and vice versa.

SOLO ACTIVITIES: for mini-solos or the real thing.

- Have each student write a letter to herself mailed 6 months later.
- Have each student write feedback for each of the others in brief notes; you collect and distribute these on cairn checks.
- Have students draw names and make gifts for one another.

## ☐ NIGHT ACTIVITIES

In case your crew doesn't schedule its own all-night bushwhack, here are some activities to keep them from sleeping too much.

Bivouacs: ridges and peaks on clear nights are great for these. If you get rained off your Table Rock day, you might be able to walk up the mud chute to Lunch Ledge, bivy there, and do the last 2 pitches at the crack of dawn before another crew gets up to you. Or you could try the "airplane crash" approach where your crew has been able to rescue 6 sleeping bags, 2 flashlights, 3 candles, 1 pot, 2 ponchos, and a ball of string (or whatever) from its downed craft before it exploded. Or give your crew a list of 20 items and let them choose which 5 to take.

Watch the sky: on pp.98 you will find how to tell time by the moon and directions by the stars. Try a short bushwhack traveling only by the stars. Have everyone keep watch for an hour throughout the night; then have the last person awaken the crew before dawn for an early start.

Day activities at night: Do the zip at night; have a lantern at either end and watch your students disappear into the dark. Get a jump on your expedition by hiking out the night before. Try a silent walk to increase your awareness of night sounds.

Sneak around: Do something (nice) without anyone knowing it was your crew: empty the compost, bake a cake for the cook, clean out all the vans, fix an eroded spot in a trail, etc.

The Seton Watch and mini-solo ( p.129 ) are good night activities as well; so are virtually all the Talking Games ( p.127 ).

## ☐ CAVING ACTIVITIES

Blind leading the blind: The crew is roped together in a safe passage. No lights. Each person takes a turn leading. The stream passage is ideal.

Situation or simulation: Stage a mock rescue through crawlways, large passages (wet or dry) and up or down walls.

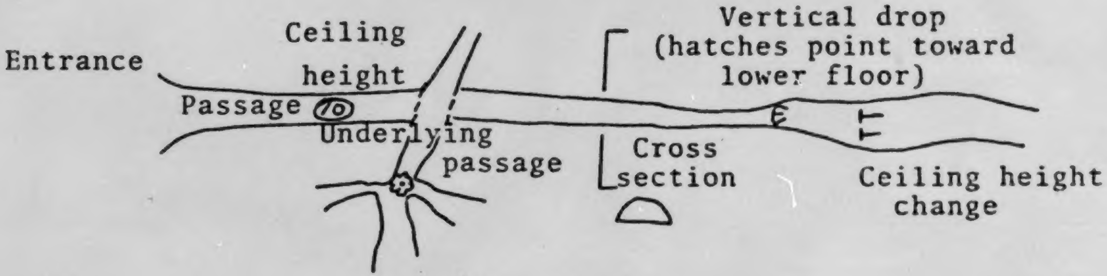
Initiatives: Ones that might be easy outside, but difficult in the dark.

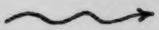
Scavenger hunt: Be careful not to disrupt the flora and fauna in the process.

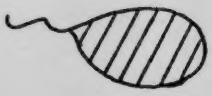
Group solo: The group is set out on a ledge, all attached to a fixed line with carabiners and slings, for 8-24 hours. No lights. If the group will be out "overnight", let them take a few sleeping bags.

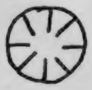
Mapping: Ask your crew to map a section of the cave, using the standard symbols shown below and on the following page.

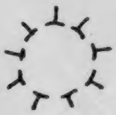
## CAVE MAPPING SYMBOLS

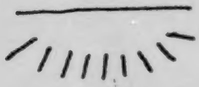

Entrance
Ceiling height
Passage
10
Underlying passage
Vertical drop (hatches point toward lower floor)
Cross section
Ceiling height change

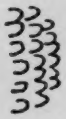

Stream

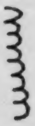

Water


Pit

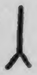

Dome

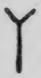

Mud Slope

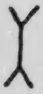

Flowstone on Floor

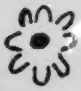

Rimstone Dam

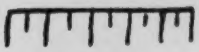
## CAVE MAPPING SYMBOLS, Cont.

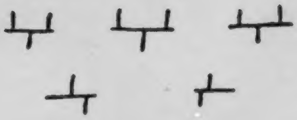

Stalagmite

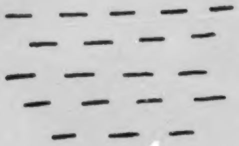

Stalactite

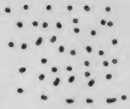

Column (sm)

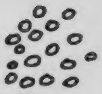

Column (lg)

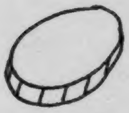

Soda straws

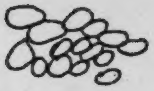

Bedrock


Clay


Sand


Gravel


Breakdown (lg)


Breakdown (sm)

## ☐ SIMULATIONS

### A SUCCESSFUL SIMULATION DEPENDS ON:

- Imagination and ingenuity: Create a situation where this injury could have happened.
- Make-up: Using your knowledge of the various types of wounds and their nature, simulate the wound as closely as possible.
- Staging: Realism can be achieved by placing the victims in positions in which they would ordinarily be found following an accident, and by arranging props to indicate the cause.
- Acting: The victim should know the nature of the injury and something about the symptoms. She should be able to respond in a manner indicative of her injury. Select your victims very carefully. Start them on small things first. Give them as much consideration as possible. They will be uncomfortable; try to minimize this as much as possible given the situation.
- Debriefing: After a simulation, students may be in shock and feel tricked. An effective debrief will help them to understand why you staged a simulation and how it affected their feelings and actions. Lacking a good debrief, a simulation can be a disastrous experience (see the Instructor's Handbook, p. 97, for more on the purpose of simulations).

### PREPARATION OF MATERIALS

### Making Blood:

Thick blood: To simulate coagulated blood, mix 1/2 part vaseline with 1/2 part vermillion grease paint (if lipsticks are available, they may be substitued for vermillion grease paint). Add to this a chunk of dark blue stick grease paint about 3/4" in diameter and 3/8" long. Melt the entire mixture in a double boiler and pour it into a jar to cool.

Thin blood: Mix one quart of Zippy liquid starch with 1/4 oz. of red food coloring. Shake well (Note: Zippy has proved to be the best starch for this purpose).

### Preparation of Bone:

Get a large bone form the cook (preferably a leg bone). Boil, boil, boil, boil, and then boil again. Allow it to air dry. Smash it with a hammer and use the chips.

## Moulages:

Moulages are plastic simulated wounds. They are either tied or taped on; some of the smaller ones can be applied with spirit gum. Although they are not as realistic as the made-up wounds described below, they do allow for very rapid make-up and, in many instances, far less cleaning up afterwards. Some moulages contain a blood reservoir and pump to use for sucking wounds, open fractures, and crushed limbs.

## MATERIALS FOR SPECIFIC INJURIES

Burns: 1st degree - lipstick or vermillion grease paint
2nd degree - vermillion grease paint
vaseline
saran wrap
for small blisters, white candle drippings
3rd degree - vermillion grease paint
vaseline
burnt cork
black powder
restorative wax

Open fractures: glazing compound
matching powder
thick and thin blood
cotton
bone fragments
possibly, blue or black liners

Shock: white grease paint or powder
blue liner
glycerine

To portray vomiting: A small amount of cooked cereal can be held in the mouth and expelled when the opportune time presents itself. Cooked oatmeal, cream of wheat, Farina, or softened graham crackers may be used to simulate vomit.

To portray frothing at the mouth: Make effervescent capsules by putting Fizzerin in size 00 gelatine capsules. A capsule can be held in the mouth until needed, then chewed, giving it a chance to mix well with the saliva and then allowed to dribble out of the mouth.

To portray wounds: A thin layer of putty should be worked into the skin covering the area desired, and the edges blended into the skin. Color this with powder to match the victim's complexion. For a laceration, make a jagged opening in the putty with an orange stick (or spatula) giving it the appearance of torn flesh. Put coagulated blood in the opening with an orange stick or palette knife and squirt liquid blood on the wound. For a puncture wound, press the blunt end of a pencil or other object in the putty, line this hole with thick blood, and apply liquid blood.

## EXAMPLES

### The Snake Bite Simulation

This should be done only at the base camp by someone who handles poisonous snakes.

Place a snake (of any kind, but a timber rattler is most effective) under one of the higher student cabins, where students can see it instantly and the handler can re-catch it easily. As the crew comes into the area, have the handler/victim scream bloody murder and thrash around on the ground. She should scream just as the crew is nearing her so they can all arrive at the same time, and should make sure she screams out the snake's location before they arrive (if the snake has any sense at all, it will stay under the cabin). The victim should over-react. Should the snake leave the cabin, the simulation can be stopped at the handler/victim's discretion.

The victim should become very sober if the crew decides to cut and suck.

To prepare the victim: Apply a small mound of mortician's wax at the bite. Make two fang punctures, pack with cotton strands, and dab on a few drops of blood.

### The Electrocution-Burn Simulation

This scene is for when the sterilizer is set up in the kitchen. It is probably one of the easiest for which to prepare, and still provides maximum effectiveness. Make sure the entire crew is in the dining hall doing duty. The victim must come quickly in the back door with her back towards the kitchen, turn around, and grab hold of the cool part of the sterilzer with her right hand. Have a large, precarious pile of cans, pots, etc. stacked up beside the sink so she can knock them down as she gets electrocuted. This adds nicely to the confusion. She should flap like a flag while holding onto the sterilizer, convulse like mad , and scream at the top of her lungs. Then she should drop off the sterilizer, hit the floor convulsing (practice first) and hold her burnt hand up in front of her so they will see it. The scene can be modified for different places.

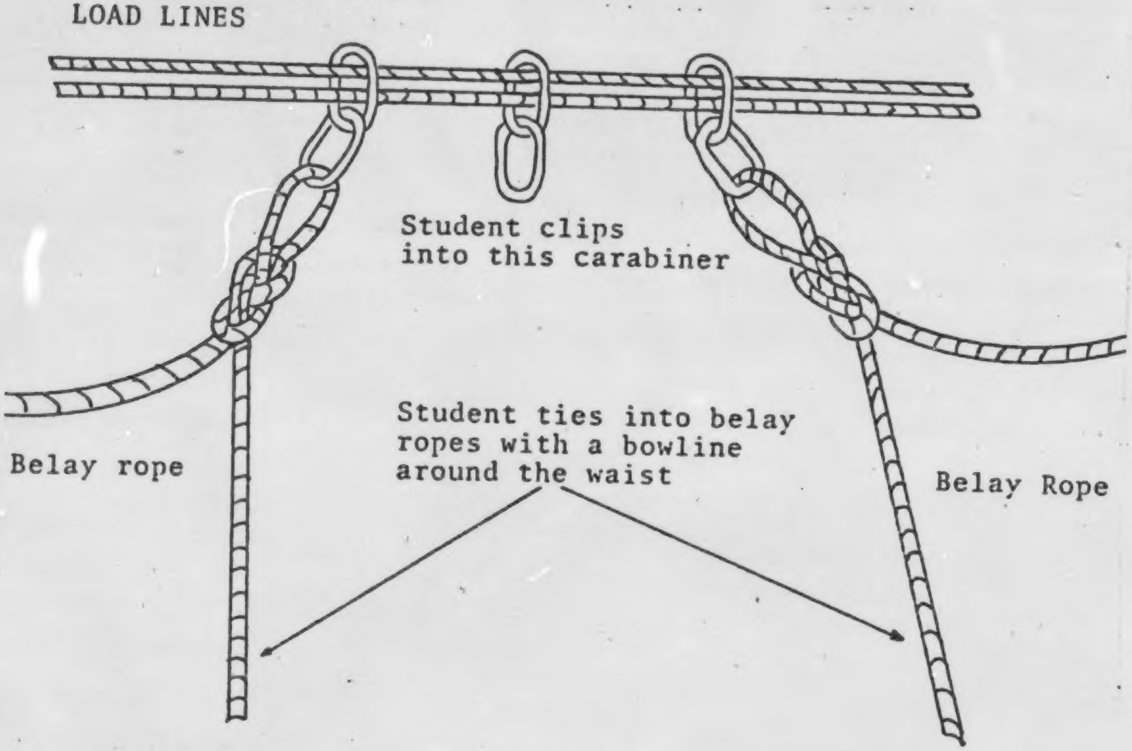
To prepare the victim: Spread a thin layer of mortician's wax (or vaseline) on the inside of the right hand. Sprinkle ashes in it from the fireplace. Close the hand and open it again. Now add blood to the third degree burn. Add a drop of blood coming out of the ear canal and chew up a piece of blood-soaked tissue paper in the mouth.

***

## ☐TYROLEAN TRAVERSE

A Tyrolean Traverse is used to move a person across a river or gorge without having to wade or climb down and back up again. Across a river, it can be set up between two trees; across a gorge, from one lip to another, anchored on boulders or thread-throughs.

1. Set up and tighten two load lines across the gorge. A transport knot (See Appendix 2) is a good way to tighten them.
2. The student puts on a seat sling and carabiner, as for a rappel. Her carabiner is clipped to another locking biner which is clipped over two load lines (see illustration).
3. The student has 2 belays, so she ties into two ropes with bowlines around her waist. 3-4 feet from each bowline, she ties a figure 8 knot which is clipped into a carabiner clipped over the load lines. One goes to a belay on the side where she starts; the other to a belay where she ends up. The belays should have anchors seperate from those of the load lines.


LOAD LINES
Student clips into this carabiner
Belay rope
Student ties into belay ropes with a bowline around the waist
Belay Rope

## ☐ MORE ABOUT THE ROPES COURSE

The Instructor's Handbook, pp. 139-141, has procedural and safety guidelines for the NCOBS ropes courses. Here is some more information about them.

### GENERAL DESCRIPTIONS

Presently NCOBS is using two high (30'-70') ropes courses with similar events, but each with a unique design. The western base camp, Green Cove, has a circular design, with the entrance and exit being the same vertical net tube ascending into a horizontally-suspended cargo net. To keep people from climbing up and possibly getting hurt when the base camp is not in use, the vertical entrance/exit tube is hauled up and left lying in the cargo net. The main base at Table Rock has a "Z" shaped design that goes higher and higher between three trees. The entrance is the same as the one at Green Cove, but the exit is a thrilling ride on a giant swing, which eventually dies down only three feet off the ground.

### PHILOSOPHY OF DESIGN

A safe ropes course is a work of art. It takes a good imagination to design one that frightens participants and yet that they can complete once they overcome their initial hesitancy. If it is too frightening or difficult, it will destroy self-concept instead of building self-confidence. Options can be devised to challenge the more physically fit, but the trees shouldn't be cluttered up with a mass of confusing events. The course should instead require a great deal of mental commitment. A good ropes course is clean, simple, safe, and scary. It tries to put all of the participants "in the same boat" by making the events harder psychologically than they are physically. At the same time, it requires a physical effort: they must bend, balance, crawl, climb, squeeze, stretch, pull, lift, lower and think their way thru the circuit. The events are laid out to give them the greatest feeling of security at the beginning, with a progression of greater exposure as they become more comfortable in the trees.

The courses were designed to try to eliminate maintenance (as much as possible), vandalism, belays, and time spent on the ground instead of in the air. The construction of such a course is a major project, taking from 1-3 weeks depending on experience, man-power, materials, weather, imagination, the height of the course, and the types of trees in which it is built. The higher it is, the more effective it is--safe size of tree diameters may be a limiting factor.

## Advantages

The design allows for most people to be up in the course at one time instead of being on the ground watching. This enables them to get used to the height while waiting on persons ahead of them, and allows group members to be nearby to offer encouragement to one another. There is also room for two instructors to observe participants and come to their aid (this is rarely necessary, given the self-rescue techniques explained below). It takes an average of about 4 and 1/2 hours to complete for a group of 14, with each person in for about 1 and 1/2 hours. The time varies, however; it may take anywhere from 3-8 hours depending on the crew. It can be plugged in to take the place of another activity which has been rained out, such as rockclimbing, or it can be used at night by moonlight or with a Coleman lantern, after having been done in the daylight and at the instructor's discretion.

## Disadvantages

One drawback to the design is that the trust factor is lost since belays are not used. Another is that having everyone clipped into a safety cable at all times might lessen the fear of falling, but lack of fear never seems to have been a problem.

## SAFETY SYSTEM

Over most of the events there is a 7/16 inch steel safety cable, onto which the participants clip for protection. Before leaving the ground, participants are instructed in the use of the "lobster sling" which they will use to clip onto the overhead cables:

1. A double figure-8 knot is tied onto each end of an 18'-long, 7/16"-diameter goldline sling rope.
2. A larger figure-8 loop is tied in the middle of the sling rope and is tightened around the participant's waist.
3. A locking steel carabiner is clipped into each of the smaller figure-8 loops at the ends.
4. Both carabiners are clipped onto the overhead cable for each event.
5. When participants come to a junction in the ropes course, they un-clip one biner and attach it to the next cable; then they un-clip the second biner and and attach it also. This system allows them to be protected at all times.

Participants are also instructed in self-rescue techniques for the course. All participants have prusiks (5-foot sling loops of 5.5 mm perlon tied with a double fisherman's knot) which they leave tied around the two goldline ropes that come from their waist loop knots. These are kept tucked away unless someone falls on an activity and is not able to get back on. Then she can pull out the prusik and step up into it, taking her weight off her diaphragm. Participants are further instructed in the use of etriers (short rope ladders) which instructors stationed in the course will bring to them if they are unable to self-rescue with their prusiks.

It is very rare for a participant to be unable to rescue herself. Due to the tremendous fear of falling it is very unusual for anyone even to come close to coming off an activity. We have this particular safety system because there is always that chance. Before going up in the course, each participant must:

- -Be wearing a good quality helmet.
- -Tie on her own lobster sling and prusik.
- -Practice transferring her carabiners from one cable to another, and practice self-rescue with both prusik and etriers, in a practice area on the ground.
- -Watch an instructor demonstrate the course.

## SPECIAL CONSIDERATIONS FOR SOME EVENTS

Entrance Tube: Option: No feet.

Postman's Walk: Option: One hand only.

Balance Beam: This is the scariest event for most people; therefore emphasize walking the ground log during the practice session. Have participants look at a point directly across from them at the end of the beam, spread their arms for balance, and slowly begin motion. The biners will drag evenly along the cable if the participant doesn't stop. If some folks just absolutely can't or won't do it, allow them to hold their sling ropes. Option: backwards; eyes closed; or backwards with eyes closed.

Hourglass: More people have had trouble (physically) with the hourglass than with any other event. Physical challenge is not the purpose of the course, but it's difficult to design an hourglass that doesn't throw people off, and this one is constantly being re-designed. Have students study it before attempting it. Report any falls to the program director. Be ready to lower participants from this area if they are unable to self-rescue.

Zip Wire: Make sure the retrieval cord is hanging free before the participant leaves the tree.

Horizontal Rope Ladder: With weather changes, the ladder may stretch out and be low, so suggest participants slide the figure-8 knot of their belays around to their sides for more slack. Do not let them put the knot behind their backs --this would leave them hanging upside down if they fell.

Birth Canal: Teach participants how to wrap the lobster slings around themselves to prevent tangling them in the net as they crawl through. Lobster slings can also be tucked down inside a shirt. Warn participants that if they yank their stuck slings free, they may catch a biner in the mouth.

They may go down the tube head first if the instructor feels they are capable of controlling the slide. They must NOT slide fast if they go down head first, due to the chance of a neck injury should a head or helmet get caught.

Breath-taker: Emphasize a very gentle exit from the butt box and being still while swinging. A lunge or sideways wiggle may cause the arc of the swing to deviate into a tree. For the same reason, do not let participants extend their feet and lean back or pump to go higher. Caution the ground crew not to interfere with the swinger until she is going fairly slowly. Then they should begin slowing her down by touching her with their hands. Do not let anyone run out in front of a swinger, trying to catch her--she may get knocked on her _____.

## ☐ REQUIREMENTS FOR CAVE LEADERS

- NCOBS INSTRUCTOR: Must be a qualified instructor or assistant instructor at NCOBS.
- EXPERIENCE: Must have previous caving experience.
- CONSERVATION:
  - Must keep abreast of new conservation ethics.
  - Must instill an attitude of safety and conservation while in the cave.
  - Must be knowledgeable in such subjects as formation protection, living underground, and proper travel.
- PUBLIC RELATIONS:
  - Must be familiar with the specific situation of the cave visited (i.e. where to park, cave owner's permission, landowner's names, releases, etc.) Must create an awareness of this subject in all

crew members.

- RESCUE:
  - Must have had actual practice of rescue techniques specific to the cave visited.
  - Must understand the increased complications of cave rescue over cliff evacuation, and must present this in the safety talk then first entering the cave.

In addition, the cave leader must be familiar with the specific cave into which she takes a crew: have knowledge of danger areas, delicate formation areas, etc.

## ☐ GUIDELINES FOR LEAD CLIMBERS

The following policies are used as guidelines in the selection of climb leaders. Having the minimum skills does not guarantee selection as a leader; that is up to the discretion of the climbing staff.

Previous experience: It is assumed that the leader candidate has already established a base of climbing experience outside of Outward Bound. Practical experience in lead protection, party management, rope handling, etc. cannot be gained in a short experience at NCOBS.

Minimum skills: The leader candidate should demonstrate at least the following skills:

- Set up a self-equalizing anchor system from two anchors.
- Demonstrate a Yosemite Z-drag hauling system.
- Prusik a free-hanging rope 30 feet.
- Set up a pick-off lower.

Check-out procedure:

- Candidate notifies Head Climber that she would like to check out.
- Either the Head Climber or a person she assigns will set a time convenient to all parties.
- The candidate will lead a climb of at least two pitches followed by the tester. A third party is desirable but not mandatory.
- Each checkout will include a foul-up situation that must be corrected by the candidate; i.e. a stuck climber, hung rope, z-drag situation, untied student, etc. The tester should not put herself in a position

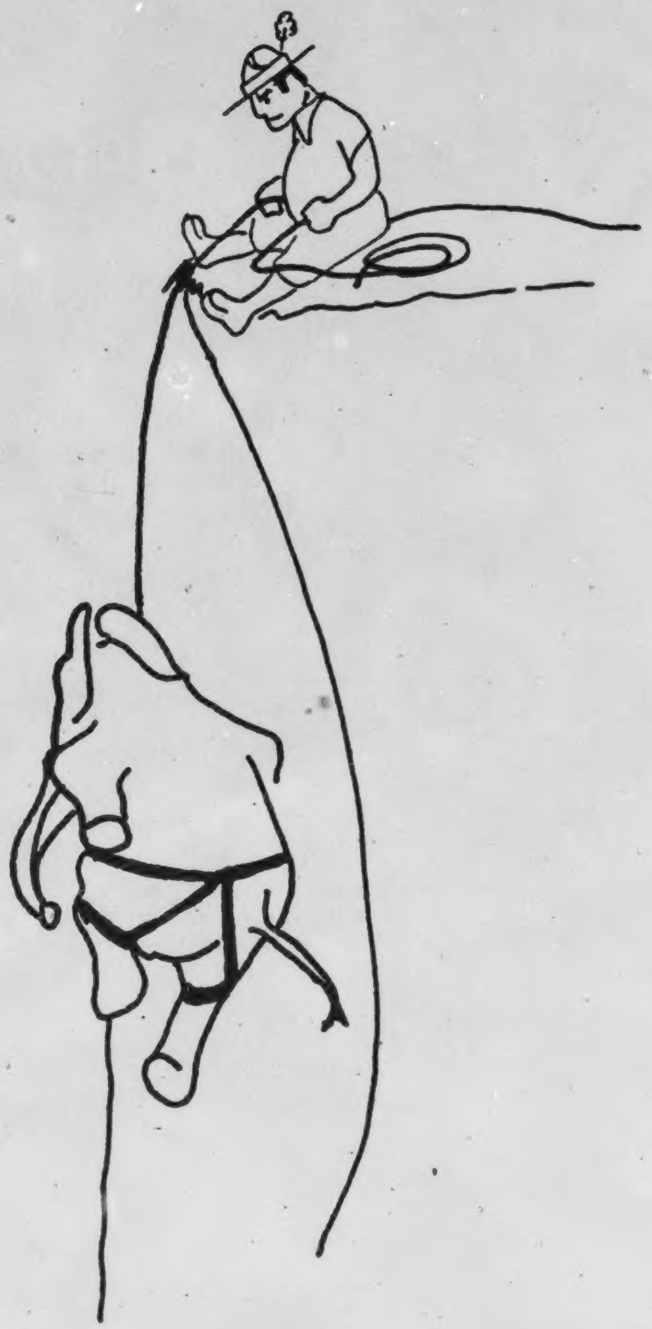
such that improper handling by the candidate would result in injury! (You faaaaaaaaaaaaiiiiiiled.....)

Criteria: Passing the checkout will be based on:

- Party management and rope management skills--did the candidate demonstrate a good working knowledge of these skills with a reasonable degree of efficiency? (if the tester can instruct or point out areas in which efficiency can be increased, she should take the opportunity after the test to do so.)
- Teaching skills--did the candidate instruct students' movements and actions in a clear, unambiguous, and timely manner? (i.e. students are not left on the belay ledge with no idea of when to unclip their anchors.)
- A high degree of safety-consciousness--the candidate must exercise an awareness of party safety at all times. If any situation is allowed to develop which endangers the safety of the party or any member, this is grounds for an automatic failure.

- Set by legendary Chief Climbing Instructor Bob Box.
30 June 1975

# Rescue



## ☐ SEARCH, RESCUE, AND EVACUATION

### INDIVIDUAL RESPONSIBILITIES

The individual must:

- have a positive attitude which enables her to be helpful.
- be mentally disciplined so that she never breaks continuity on a line search, and remains alert through hours of searching or rescue.
- know her own abilities. She should know when the terrain is getting too difficult for her, and when she needs to request a belay. For technical rock rescues, she should know how to tie into an anchor or belay using her own slings.
- follow the instructions of the team leader. If she doesn't understand them, she should ask, and if she can't carry them out, she should inform the leader. She must be prepared to be overruled by the leader, or pulled from a team for any reason.

In addition, the rescuer must be able to outfit herself for the circumstances expected. She should not count on borrowing gear from other rescuers in the field. She should carry nothing extra, as this will only slow her down. If she cannot properly equip herself, she should not volunteer. Some important items are as follows:

Footwear: Sturdy lug-soled boots are mandatory. They are useful on all types of terrain. No substitutes.

Clothing: Be prepared for the worst possible weather, given the climate and area. Long pants are useful, especially if the search is to cover brushy terrain or involve bushwhacks. Leather gloves are also useful.

Helmet: is mandatory for rescues. A helmet in rescue work is perhaps more important than in rockclimbing; with all the activity, there is increased danger of rockfall.

Headlamp: is mandatory for all rescues. Make sure it works. A hand-held flashlight is almost useless in technical rescues.

Climbing harness: Each rescuer should carry either a commercial harness or a Swiss seat of 1" tubular webbing. It's useful for rappels, tying into anchors, belaying, or making or tying a litter.

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the original document was blank

Prusiks: Carry at least two for tying into anchors, a litter, or a rope.

Carabiners: Carry at least two locking carabiners.

Waterbottle: During a long rescue, one can get mighty thirsty.

Map and compass: Maps will be issued from the warehouse. Each rescuer should familiarize herself with the map, and be competent in using it with a compass.

## SEARCH TECHNIQUES (from MOBS Instructor's Handbook)

First: Quickly sweep trails, check campsite, basecamp, and all the obvious places.

Second: By foot or vehicle, check places where a lost person is likely to be: roads, trails, edges of creeks and rivers, cliffs. Use a systematic team search of boundaries within which someone is thought to be lost.

Third: A widespread grid search of suspected locations with calling and/or searches between searches.

Fourth: An in-depth scouring of the area:

- Compass-person at one end follows a boundary.
- Each searcher stays within sight of the person next to her.
- Stop often to look behind, have a roll call, and call for the lost person.
- Look through and around all debris areas.
- End person in line puts markers wherever necessary to follow a line.
- When the party approaches the end boundary, rotate around the end person and proceed back covering the next area over, with the end person picking up her markers as she goes.
- Search explicit areas so that they can be plotted exactly on a map.

## RESCUE EQUIPMENT

### First Aid Team (Rescue Pack #1)

First aid kit
2 pairs jumar ascenders
Belay link

4 short 1-inch tubular slings
4 long 1-inch tubular slings
4 descenders
10 locking carabiners
10 clip carabiners
1 first-class 150-foot rope
2 second-class 150-foot ropes
CB radio (get from logistics chief)

not in pack; need to be issued

**Equipment Team** (Rescue Pack #2)

Bolt kit
Hammer
Stretcher, tie-ins
2 25-foot, 7/16-inch tubular slings
2 25-foot, 1-inch tubular slings
3 9-foot, 1-inch tubular slings
2 7mm long rope slings
2 7mm short rope slings
1 pair Gibbs ascenders
2 belay links
2 rescue pulleys
10 locking D carabiners
4 locking oval carabiners
2 descenders
1 150-foot first-class rope
2 150-foot second-class ropes
3 300-foot rescue ropes
3 spotlights
CB radio (logistics chief)
Stokes litter
Backboard

not in pack; need to be issued

**Support Team**

2 smoke grenades
2 Coleman lanterns and fuel
Spare headlamps
1 150-foot second-class rope
2 7/16-inch short slings
4 locking carabiners
2 descenders (or 4 additional locking carabiners)

## HAULS, BRAKES AND ANCHORS

Hauling systems: Most of the rescue techniques involving hauling are difficult and strenuous. 'Avoid them whenever possible and try other techniques instead (i.e. lowering to the ground or traversing off). The degree of difficulty depends on the number of people available to assist with the haul.

Z-drag system: (Figure 1): is a mechanical advantage system which is used when more than one person is available to haul. One person is needed to watch the keeper prusik, loosening it for hauling and tightening it to re-set the system. Others pull.

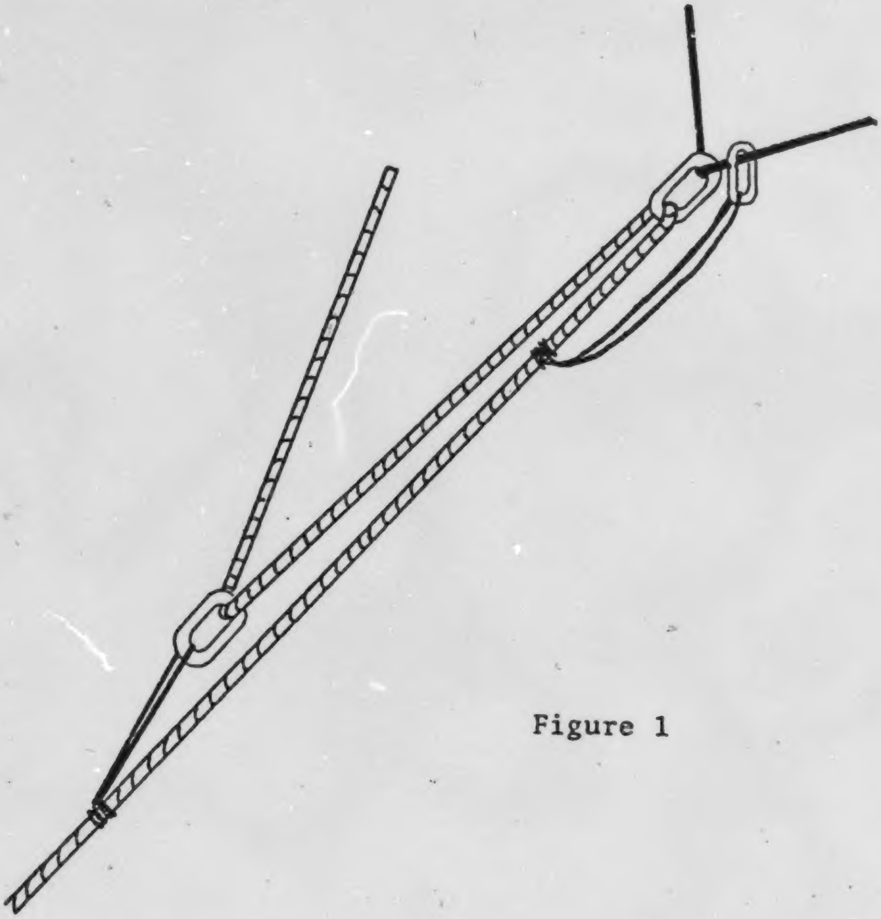
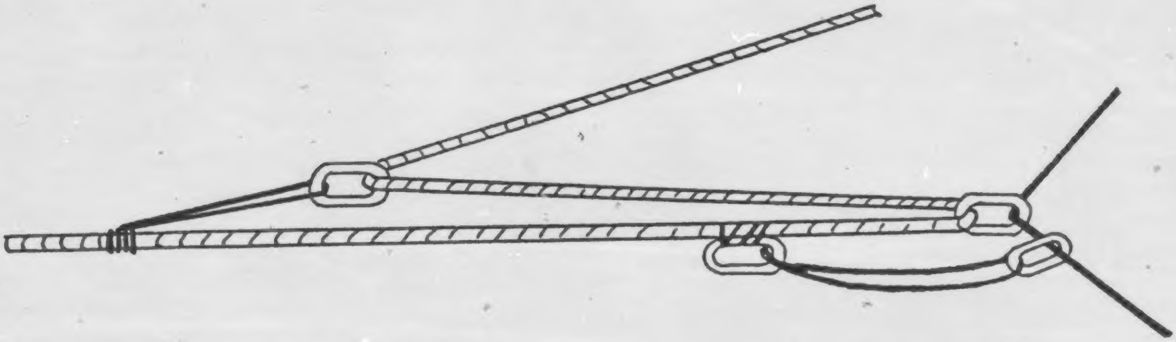


Figure 1

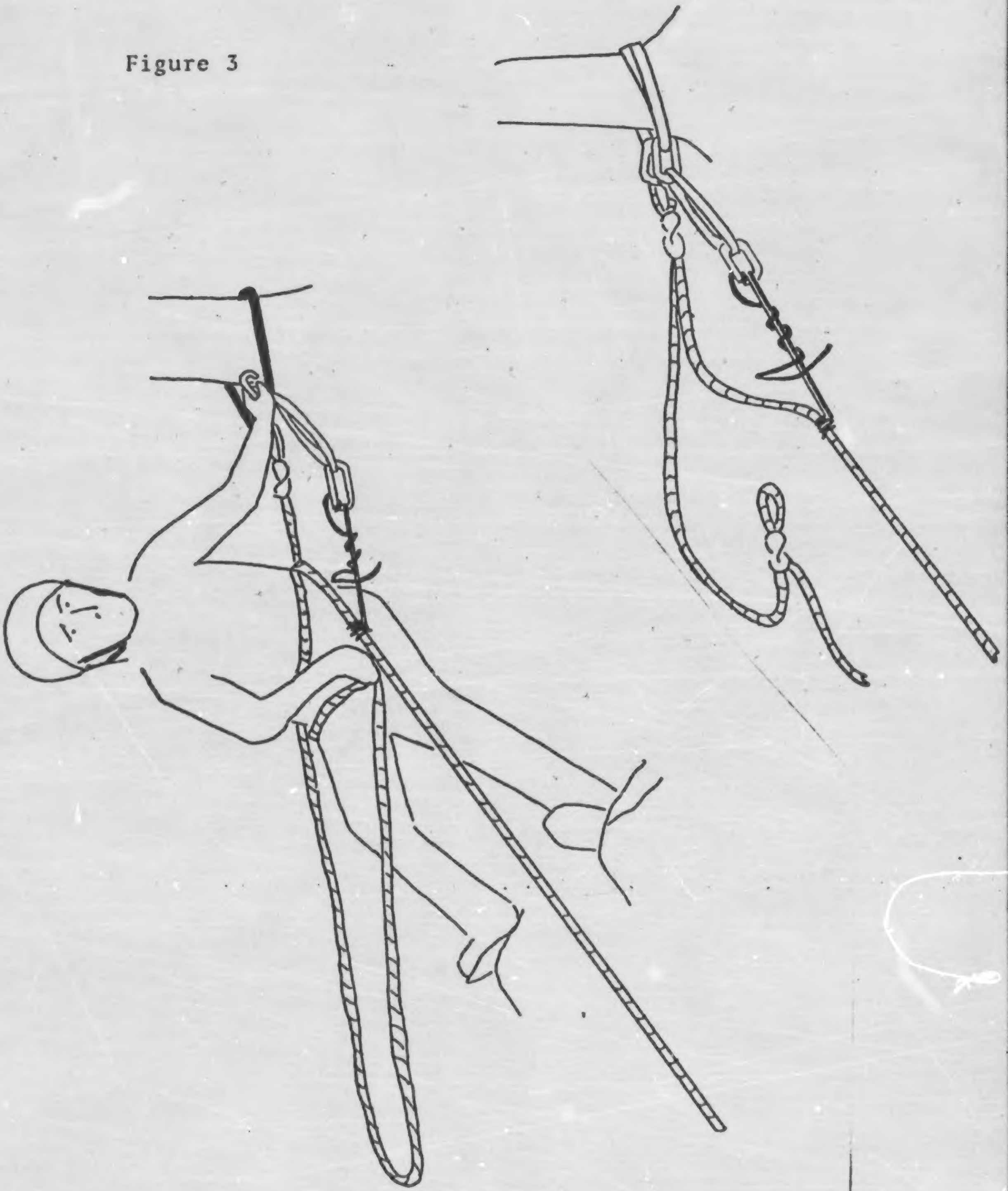
Bachman haul system (Figure 2): is used when only one person is available to haul. A Bachman knot (see Appendix 2) is used on the keeper prusik; this will allow the rope to slide through unattended when unloaded, so an attendant is not necessary.

Figure 2



Belayer escape system (Figure 3): This is a method of escaping a loaded belay line, enabling the belayer to survey the situation and then set up a haul or lower as necessary. A mariner's knot (see Appendix 2) is used to hold the loaded line; it can be untied while still loaded if necessary. The belayer can tie this knot with a prusik sling on the loaded line while still holding the belay, slide the knot as far behind her back as possible, and clip the prusik sling to the anchor. It may be necessary to extend the anchor with another prusik sling or other line.

Figure 3



Brakes: Friction brakes are used for lowering, rappelling, or belaying. They are set up with friction devices or with carabiners. All have double ropes running through them. Take care to keep clothing and other loose objects from jamming in them. Wear gloves to protect your hands.

Figure-8 descender (Figure 4): is the safest and most fool-proof of all descenders. It's easy to set up and operate and can be locked off by jamming the ropes across the top.

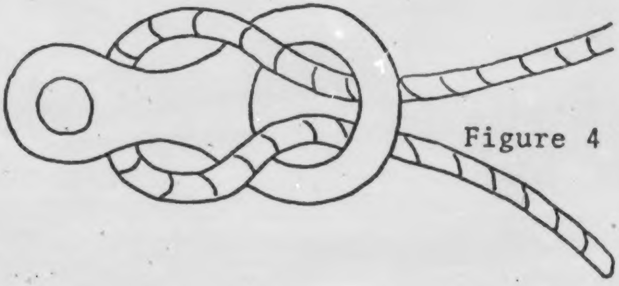


Figure 4

Sticht belay plate (Figure 5): is used mainly for belays. It is simply a plate with a rope slot, through which a loop of the climbing rope is fed and clipped into a locking carabiner. The carabiner is attached to an anchor or an anchored belayer. The rope is fed through the plate; a fall is controlled by pulling the rope back towards the carabiner, forcing it into an "S" configuration around the brake.

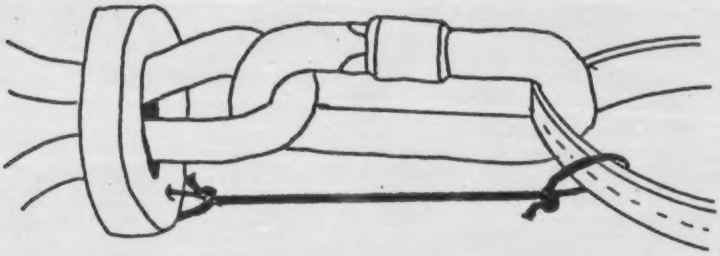
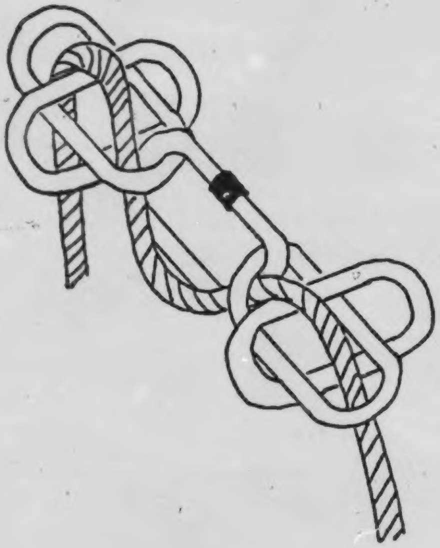


Figure 5

Double carabiner brake (Figure 6): is a system in which carabiners are set up at right angles to one another to act as a brake. The ropes pass through one carabiner (or one pair) and over another carabiner (or pair). To lower a load further than one rope length, use a knot pass (Figure 7).

Figure 6



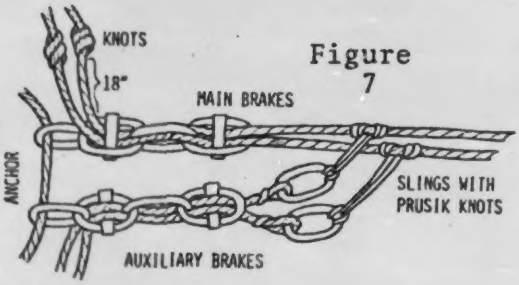

KNOTS
18"
MAIN BRAKES
ANCHOR
SLINGS WITH
PRUSIK KNOTS
AUXILIARY BRAKES

Figure
7

Anchors: (Figure 8) Use a self-equalizing anchor if a large tree or boulder is not available. When a single anchor is not strong enough to be used safely, several points may be rigged together, forming a system called a self-equalizing anchor. This type of anchor distributes the load around the various anchor points. If any of the points fail, the load is automatically re-distributed among the remaining points.

Figure 8
2 anchors

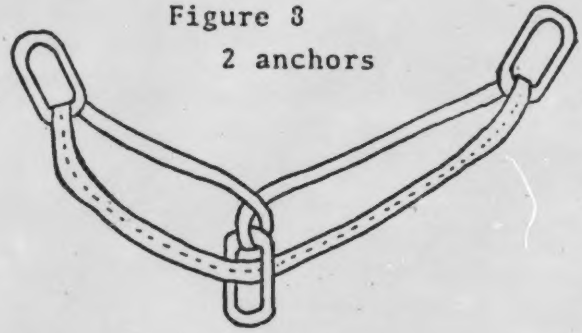
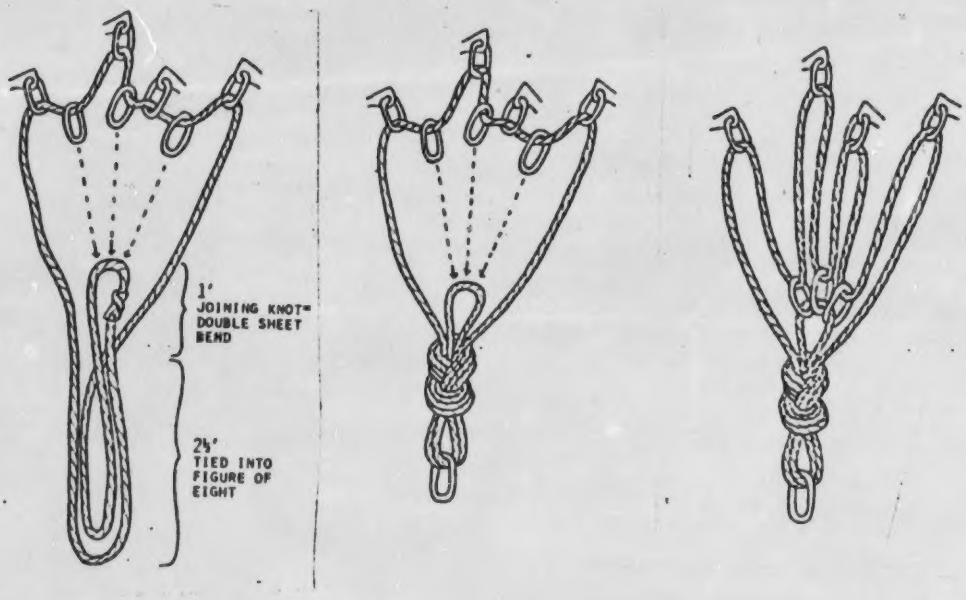


Figure 8a Multiple anchors


1'
JOINING KNOT=
DOUBLE SHEET
BEND
2½'
TIED INTO
FIGURE OF
EIGHT

## LITTER CARRIES

Securing the victim in the litter: Rescuers must first be careful to immobolize all injured body parts. The most competent first-aider should be in charge of lifting the victim and loading her in the litter. She must be tied in securely.

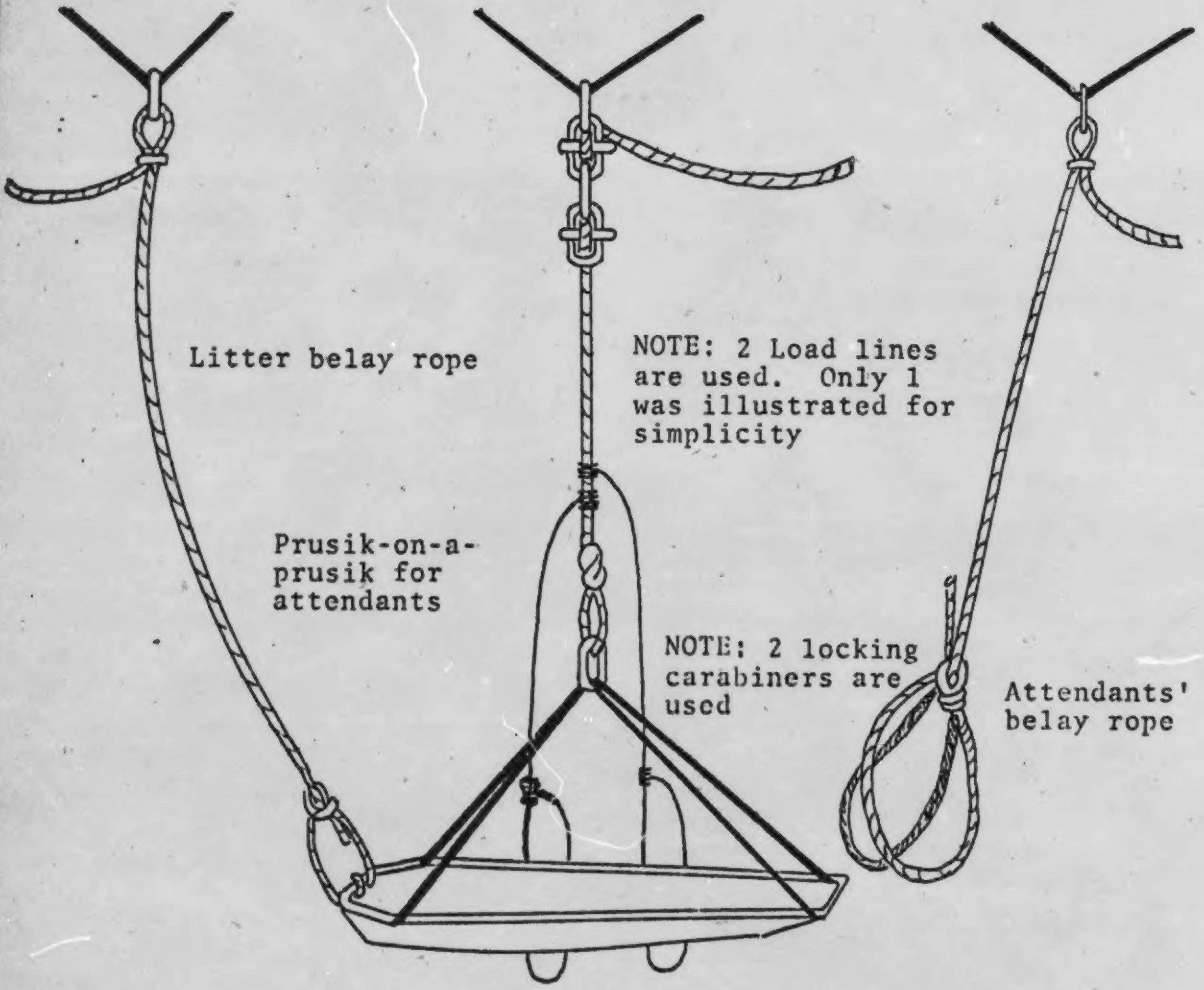
- Loop slings around each foot and secure them to opposite sides of the litter.
- A long piece of webbing may be passed back and forth over the victim and around the inner rails of the litter (Do not wrap the webbing around the outer rails--it will abrade on rocks and trees).
- Secure the victim's hands inside the litter, since she will have a tendency to grab the outer rails when the litter is bumped.

Carrying the litter: The basic litter team consists of seven people: three on each side of the litter and a team captain. The team captain is responsible for scouting the terrain, initiating litter belays, and organizing rotation of litter bearers. Litter bearers should rotate frequently, exchanging sides to prevent exhaustion. Webbing slings passed from the rail of the litter over the bearer's shoulder to her outside hand help spread the weight.

Scree evacuation (belayed litter): Many times the terrain will be steep enough so that the litter will need to be belayed for safety and steadying, but the litter bearers will not need to be belayed themselves. The belay rope should be attached to the head of the litter with a bowline which has several wraps around the rail. The litter is normally carried with the victim's head pointed uphill. To belay the litter downhill use a figure-8 descender or a carabiner brake system. The litter bearers should hold onto and lean out against the belayed litter. When belaying the litter uphill use a sticht plate. Communications between the brakeman and litter are important. Establish belay signals and use them.

Cliff evacuation I: Horizontal litter lower: (Figure 9): Horizontal evacuations are used when a victim has very serious injuries. Two attendants are lowered with the litter to assist in its descent and administer first aid if needed.

- Two load lines are run through a double carabiner brake system. The load lines are both attached



Litter belay rope
Prusik-on-a-prusik for attendants
Attendants' belay rope

NOTE: 2 Load lines are used. Only 1 was illustrated for simplicity

NOTE: 2 locking carabiners are used

Figure 9

to the litter bridle with two figure-8 knots and two locking carabiners.

- A single rope is tied to the head of the litter with a bowline for a belay. A sticht plate is used to control this belay.
- A single rope with a bowline on a bight tied at the end is attached to the attendants' sit harnesses with locking carabiners--one loop of the bowline to each attendant. This is the attendants' belay. A sticht plate is used to control this belay also.
- Two prusik-on-a-prusik slings are attached to the load lines with the attendants clipped into the loops of the sling. The attendants adjust the prusiks to position themselves correctly beside the litter.
- The attendant at the head of the litter is in charge of communication with the braking team. The "head" attendant uses standard belay signals to establish the belays for the attendants (numbered 1) and the litter (numbered 2). The only other signals are:

HOLD LOAD LINE
LOWER LOAD LINE

HOLD BELAY 1
LOWER BELAY 1

HOLD BELAY 2
LOWER BELAY 2

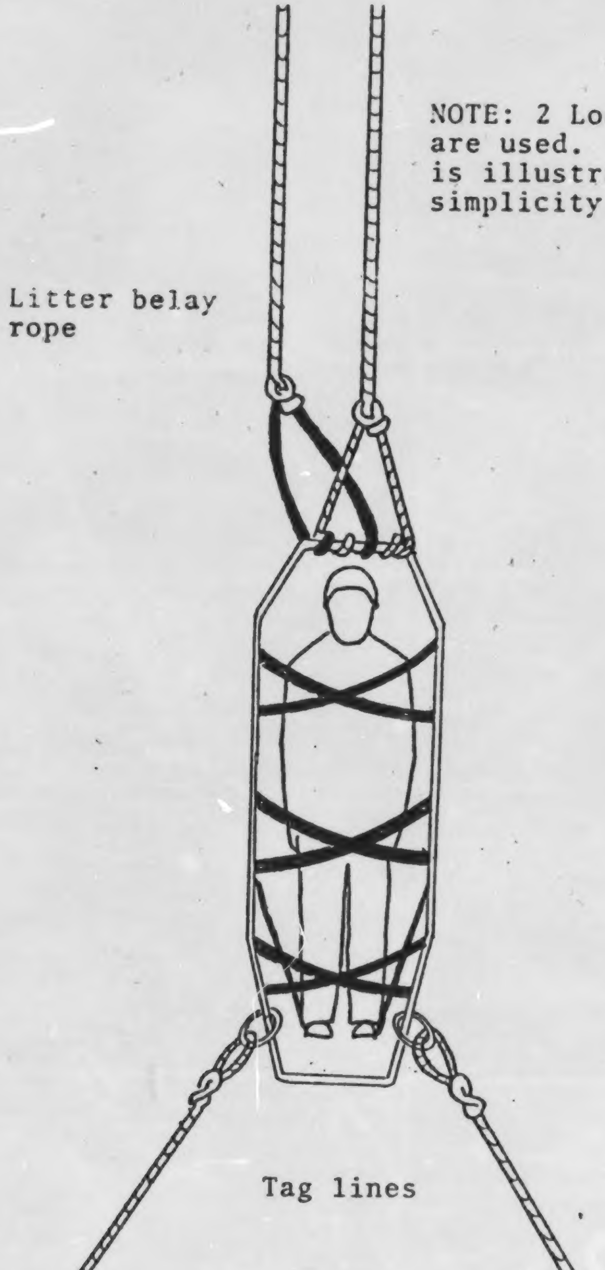
*Cliff evacuation II: vertical litter lower* (Figure 10): The *vertical litter lower* is used when the victim has minimal injuries. It cannot be used if a victim has head, neck, spinal, or leg injuries. It may or may not have an attendant.

- Two load lines are run through a double carabiner brake system. Load lines are tied to the head of the litter with bowlines.
- A single rope is tied to the litter with a bowline. This is the litter belay. A sticht plate is used to control this belay.
- A single rope is tied to the attendant with a figure-8 knot. This is the attendant belay. A sticht plate is used to control this belay.
- The attendant is in charge of communications with one rescuer positioned at the edge of the face. The same signals are used as for horizontal lowers.

To do a vertical lower without an attendant, attach the load lines and the litter belay in the same way.

- Attach two ropes of equal length to the foot of the litter with bowlines; then throw them to the ground. These ropes are called tag lines.

- Two rescuers, one on each tag line, assist the litter as it is lowered, keeping it pulled out from the rock face.


Litter belay rope
Tag lines

NOTE: 2 Load lines are used. Only 1 is illustrated for simplicity.

Figure 10

A telpher evacuation (Figure 11); is used to transport a litter horizontally or diagonally across a river or gorge.

1. Two load lines are set up as for a Tyrolean Traverse (see p. 137).
2. Two belay lines are tied to the litter rails with bowlines, one to the head and one to the foot. One belay line must be tossed across to the opposite side where the litter will land. A sticht plate is set up to control each belay.
3. The rescuer in charge initiates the belay contract for the litter.
4. Two locking carabiners are clipped to the litter bridle and then clipped over both load lines.
5. The litter is pulled across the belay lines as necessary to pull or brake it.

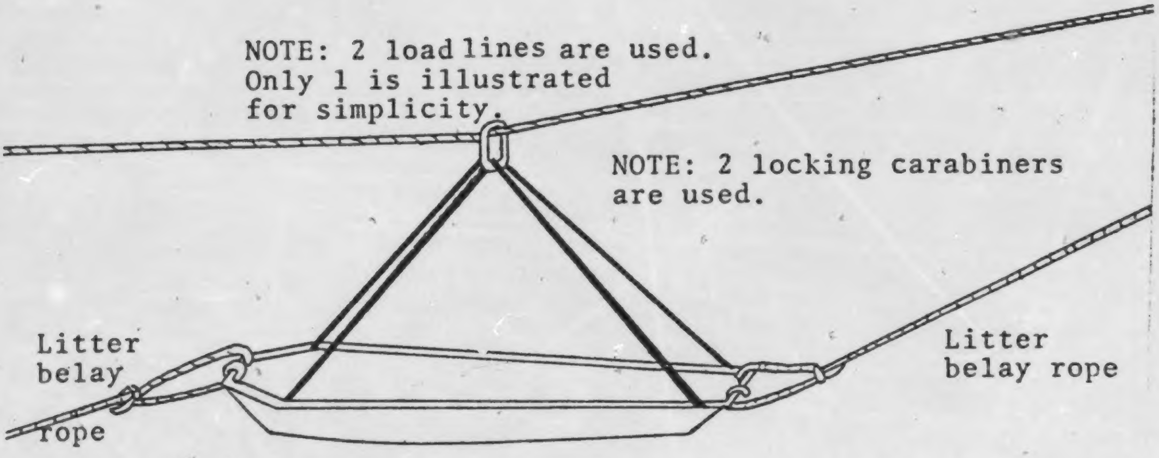

NOTE: 2 load lines are used. Only 1 is illustrated for simplicity.
NOTE: 2 locking carabiners are used.
Litter belay rope
Litter belay rope

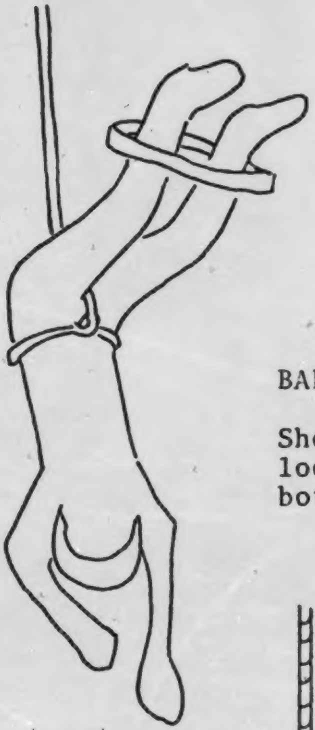
Figure 11

☐ SPECIFIC RESCUE TECHNIQUES

## METHODS OF RELIEVING WEIGHT FROM THE WAIST OF A HANGING VICTIM:

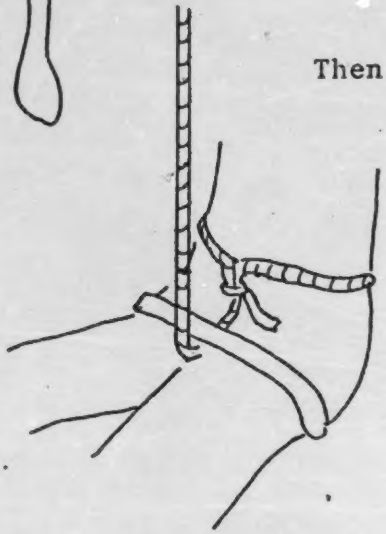
conscious and unconscious--see illustrations 12, 13, 14, and 15.

Figure 12



THE
BABOON HANG

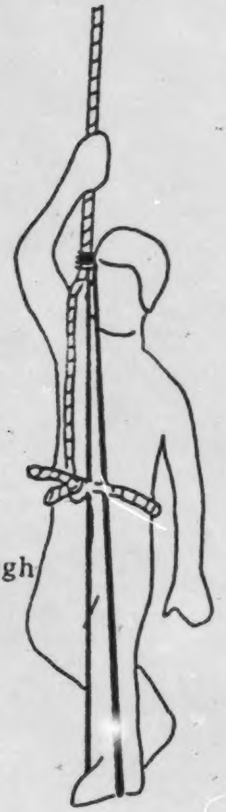
Short sling
looped over
both feet



Then sit up

Figure 13

CONSCIOUS VICTIM



USING A PRUSIK
SLING

Sling passed through the waist loop of the climber

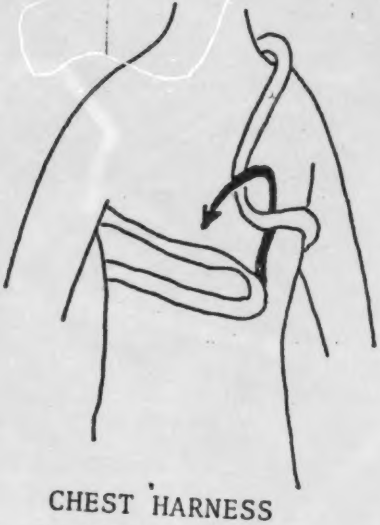


Figure
14

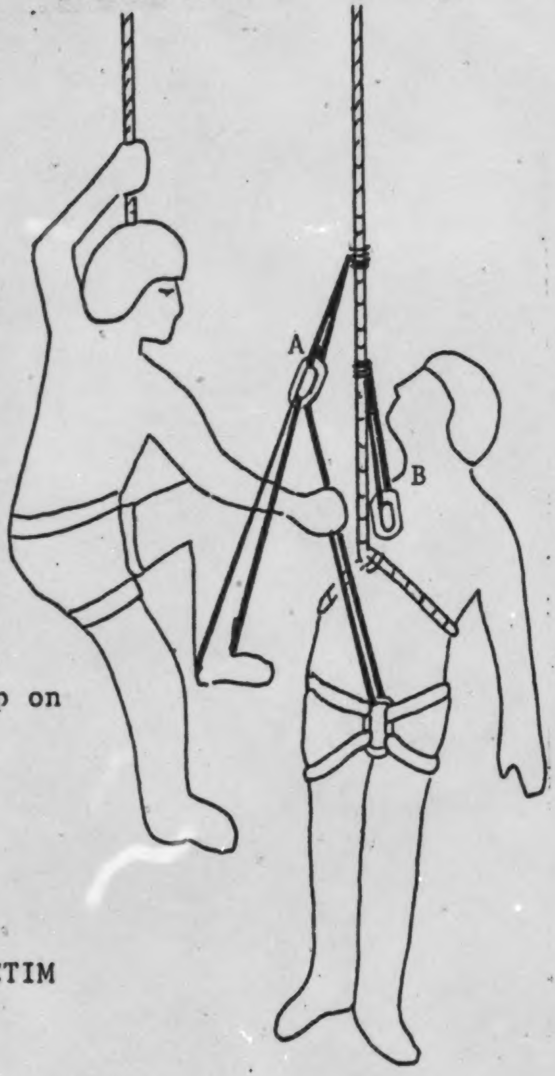
CHEST HARNESS
For UNCONSCIOUS VICTIM

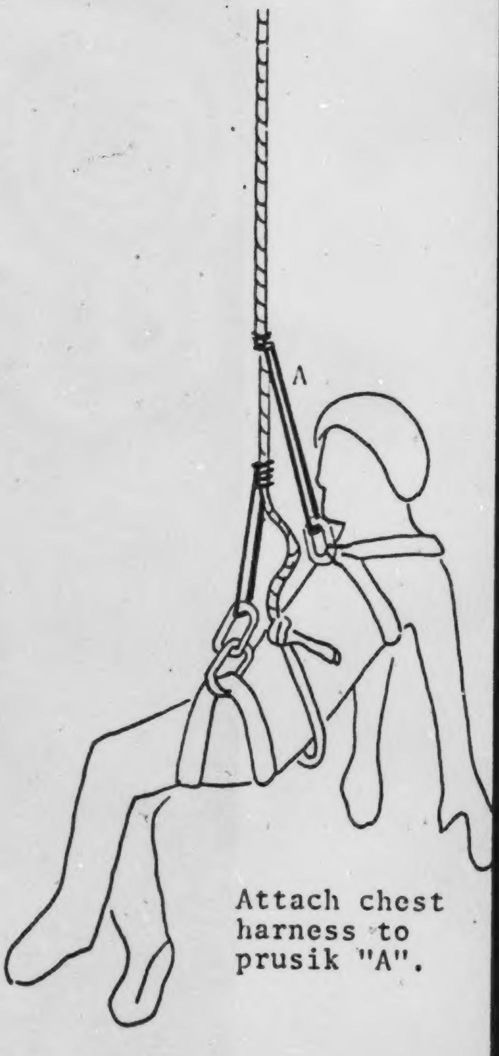
Rescuer places diaper seat on victim.

Attach prusiks "A" and "B" to victim's rope.

Clip long sling into diaper seat. Then pass it through carabiner "A". Step into sling while pulling up on diaper seat.

UNCONSCIOUS VICTIM





Attach chest harness to prusik "A".

## 7 STEPS TO A RAPPEL RESCUE

Prevention is the key to problem-free rappels--caution your students against letting clothing, hair, beards, fingers, or helmet chin-straps get caught in the friction device. If, despite all your precautions, something does get caught in the device and the rappeller is stuck, try these steps to rescue in this order. Communicate with the rappeller and make sure you know all the variables of the situation before taking action.

Step 1. Have the rappeller do a leg wrap (weave the rappel ropes in a figure-8 pattern over and under her thighs) and carefully try to work the obstruction loose.

Next, try to relieve tension from the friction device by transferring the rappeller's weight off of it:

Step 2. Briefly pull up on the belay rope.
Step 3. Lower a rope or sling for the rappeller to stand in, if she is within 30 feet of the top.
Step 4. Lower a prusik sling on a biner down the belay rope. The rappeller can tie a prusik on the rappel ropes above the friction device and step up in the sling.

Now have the rappeller try to work the obstruction loose again:

Step 5. Lower a knife on a carabiner down the belay line so the rappeller can cut the obstruction away (make sure she knows what to cut!).
Step 6. Rappel or prusik down on another rope to help.

Finally, if all else fails:

Step 7. Have the rappeller do a baboon hang, and haul her up on the belay rope, using a z-drag.

## ROPES COURSE RESCUES

### Emergency Exit Tube at Table Rock

- Description: This is the long U-shaped tube that doubles back under the butt box limb. When it is untied, one end drops to the ground. It has three openings; one at the top, one at the bottom, and one at the butt box limb.

When to use: Only when necessitated by lightning, high winds, or rain-soaked students whose reasoning abilities might be affected by the cold and darkness coming upon them.

How to use: Release the 2 slippery half-hitches that hold up one end of the net. Leave the release rope on the tree. Be sure people below (on the limb and on the ground) are out of the way.

Replace: as soon as safely possible. Tie one end of a third-class (slash) rope to two sides of the bottom of the tube. Run the other end of the rope thru the come-a-long which is anchored to the zip wire cable (against the tree) and use this to crank the tube back into position. Take the end of the release rope and make 4 round turns around the net; then tie it off with 2 slippery half-hitches.

## Emergency Exit Sequence

When the decision has been made to evacuate, STOP everyone where she is and get everyone's attention. Inform each participant of her exit plan. The few seconds that it takes to organize will speed the evacuation by prevention chaos of questions and misguided movements. The sequence outlined below is for the Table Rock ropes course. Instructors at Green Cove should use their common sense to determine whatever sequence is best, given the particular positions of their crew members at the time an evacuation becomes necessary.

### Procedure

Cargo net: back to beginning
Burma bridge: backwards via cargo net
Postman's walk: backwards via burma and cargo net
Beam: backwards via postman's, burma, and cargo net
Breath-taker: either swing down, or use emergency exit, or go backwards to beginning
Hourglass: back to emergency exit via beam
Kitten crawl: back to emergency exit via hourglass and beam.
Houdini's: forward to emergency exit via zip
Zip: emergency exit (upper opening)
Horizontal rope ladder: emergency exit (upper)
Birth canal: emergency exit (lower opening or upper opening via ladder)

Rule Changes for Evacuations:

- Carabiners do not have to be locked and unlocked at each junction, if, in your judgment, immediate evacuation is necessary (lightning is probably the only case). Inform everyone of this.
- Up to 5 people may be on an event at once. Inform.
- The emergency exit may get crowded. Keep the limit to 5 in the tube at once.
- Certain situations might not lend themselves to this procedure--use your own judgment.

## Emergency Lowering Procedure

Materials are stored in both ropes courses which enable an instructor to lower a participant from any point in the course.

Location:

| | |
|---|---|
| At Table Rock: | in the brown wooden box on the tree at the end of the balance beam. |
| At Green Cove: | in a box on the tree at the beginning of the balance beam. |

Contents: one 150' 2nd-class rope with a triple bowline tied in one end; a figure-8 descender; a sharp knife; 2 locking biners.

When to lower: only in the following cases:

- Participant has fallen off an event and is unable to do a self-rescue. You can't get her back up and you feel that she would not be able to continue anyway.
- An accident has occurred which is not serious enough to require a Stokes, but the participant cannot continue.
- An emergency exit is necessary and lowering a participant would speed it up.

Lowering

1. Try to get the participant to stand in an etrier or prusik to relieve pressure on the diaphragm.
2. Put the triple bowline on the participant. If it's just a little loose, don't worry; but retie it if there is any chance the participant will fall out of it (Know how to tie this knot well. See Appendix 2).

3. Clip the triple bowline to the participant's waist loop with a locking biner.
4. Put the lowering rope through the descender and clip the descender to the overhead safety cable; then throw the rest of the rope down.
5. The ground crew lowers the participant by controlling the rope from the ground. The instructor with the participant also controls the rope from above.
6. Cut the lobster sling if the participant is unable to momentarily relieve weight on it by stepping in an etrier.

## ZIP WIRE RESCUE SYSTEM

To rescue a participant from the middle of the zip wire (trolley has jammed):

Instructor needs:

Swiss seat
lobster claws with 2 steel biners
biner attached to waist from rear
knife
headlamp, at night

Rescue Bag (Karrimore Pack) contains:

one 150' rope, threaded through a figure-8 descender with attached biner, with a triple bowline and biner tied in one end
vice grips
etrier with attached chest sling and carabiner

## Rescue Sequence

1. Send the etrier down the wire immediately--have the participant stand in it and place the 1" webbing around her upper body.
2. Drop the parachute-cord haul line from the tree stand and bring up the trolley rope. Attach this to the instructor's rear biner.
3. Clip the rescue bag onto your sit harness.
4. Clip both lobster biners onto the zip wire and ask students (minimum of three) to belay you down to the stuck participant.
5. After reaching the participant, put the vice grips on the cable past the trolley to prevent it from running should it suddenly get free.
6. Clip the descender to the zip wire with the attached

biner; clip the biner on the triple bowline to the participant's wasitline; help the participant into the triple bowline.

7. Drop the rescue rope to the ground, ask students below (at least 3) to belay the participant down. Unclip the participant from the cable as she stands in the etrier (if she is unable to stand, cut her away).
8. Clear rescue gear from the cable, clip around the trolley with the lobster claws, and have students belay you to the brake area. You may have to stand in the etrier to unload the lobster claws to clip around.

## CAVE RESCUE

Cave rescues tend to be more difficult than cliff rescues --particularly when tight passages must be negotiated. In many cases specialized equipment and qualified personnel are needed, and outlining the procedures is beyond the scope of this field manual.

If you need help with a cave rescue:

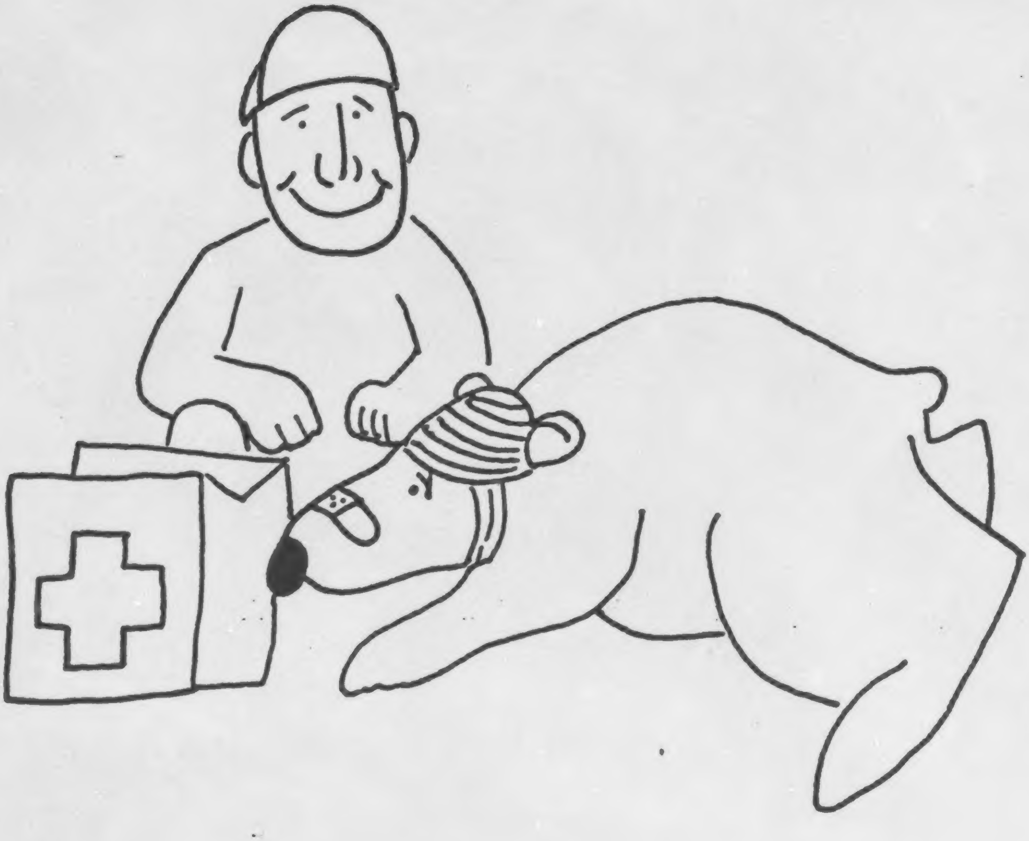
1st. Notify NCOBS
2nd. Contact one of these experienced cave rescuers:

R.E. (Whit) Whittemore or Annie
4107 Ranch Road
Johnson City, Tennessee 37601
(615) 926-2904

Don Davison, Jr. or Sheryl Jones
319 Kilbourne Avenue
Appalachia, Virginia 24216
Home: (703) 565-1718
Work: (703) 523-2925

3rd. If you can't make contact with any of the above, call the sheriff and ask that he get in touch with qualified cavers for you. Be wary of local rescue squads (use them only as a last resort) and unqualified cavers that may show up.

# Medical Information



## ☐ FIRST AID KITS

Below is a list of the contents of the crew first aid kits. Each kit is numbered. Your crew is responsible for the specific kit they are issued, as well as its contents. The most commonly used items can be resupplied from the box in the warehouse. If you need something else, see a logistics person.

Student kits include prescription drugs (benadryl, isuprel, Tylenol III, and lomotil) and a prescription bee sting kit (Ana-kit) containing epinephrine. We account for the use of these drugs in this manner:

- Each first aid kit has 10 of each drug and one unused Anakit at the beginning of each course.
- The drugs are not resupplied, except by special request.
- If any of these drugs are needed during the course, the instructor makes a record of who used them, why, and when.
- At the end of the course, the instructor's record shows which drugs are missing, who used them, the date used, and the number destroyed (if any). Both the logistics staff and the course director need this information.

All the prescription drugs are potentially dangerous and should be used only after a careful reading of the information here on their uses and side effects.

Epinephrene must be used by instructors only, except on final expedition. Familiarize yourself with the procedure listed on the inside of the Anakits before your course begins.

### FIRST AID KIT CONTENTS

| Oral Medications | |
|---|---|
| aspirin | 10 |
| tylenol | 10 |
| tylenol III | 10 |
| Tums | 10 |
| polymagma | 20 |
| lomotil | 10 |
| benadryl | 10 |
| isuprel | 10 |
| salt tabs | 20 |

| Dressings | |
|---|---|
| bandaids, regular | 20 |
| bandaids, large | 5 |
| butterflies | 10 |
| gauze pads, small | 10 |
| gauze pads, large | 10 |
| topper sponges | 10 |
| saran wrap--enough to cover chest and abdomen | |

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### Liquids

Betadine surgical scrub
calamine lotion
Iodine (for water purification only)
insect repellent

### Bandages

roller gauze (1)
muslin bandage (1)
carlisle bandage (1)
6" ace wrap (1)
Triangular bandage (5)
2" tape - 1 roll

### Others

Octagon soap
moleskin 9" x 11"
matches in case
tampax (10)
scissors
tweezers
thermometer
pen
safety pins (10)
first aid book
report forms (5)
dimes (4)
drug contents booklet
airway
sunscreen
neosporin ointment
vaseline

### NOTES

- Be familiar with the contents of the first aid kit.
- Do not unwrap seldom used items for demonstration. There are practice items in the resource room.
- Do not add labels to bottles; supplemental information is in the drug contents booklet and first aid book.
- Do not keep trash in the first aid kit!
- Keep items tightly wrapped in plastic bags--the first aid kit is not waterproof.

## VEHICLE FIRST AID KIT CONTENTS

There are also first aid kits in the trucks (contents listed below), in the kitchen, and in the resource room. These kits are for emergency use only; do not use them to resupply your crew first aid kit. This is important if these kits are to be useful in an emergency.

-- Kit is located under front passenger seat.

### Dressings

2 12" x 12" trauma dressings
3 6" x 8" trauma dressings
25 4" x 4" gauze pads
25 2" x 2" gauze pads
25 1" bandaids
15 2" bandaids
20 butterflies
10 vaseline gauze pads
20 telfa pads
1 9" x 20" saran wrap
10 eye pads

**Bandages**

5 triangular bandages
2 3" ace wraps
1 6" ace wrap
3 2" rolls tape
2 4" slings

**Others**

20 cotton swabs
1 bottle eye wash
2 adult airways, medium
10 tongue blades
1 Hemostatic forceps
1 scissors
1 pair choke savers
3 bite sticks
1 tourniquet stick

## ☐ DRUGS IN NCOBS FIRST AID KITS

This section provides a basic analysis of the drugs (prescription and non-prescription) carried in NCOBS first aid kits, and offers some information on their actions and reactions.

As a general guide to safe drug use:

DO NOT:

- Change the dose or timing of any drug, except on the advice of a physician.
- Take any drug in the dark. Identify every dose of medicine carefully in adequate light to be certain you are taking the drug you intended to take.
- Continue to use a drug which you feel is causing adverse effects.

DO:

- Keep a written record of all drugs taken.
- Record any adverse reactions.
- Carefully consider whether it is safe to engage in hazardous activities while under the influence of drugs with possible significant side effects, such as benadryl.
- Ask for clarification of any point that is difficult to understand regarding the contents of the first aid kit.
- Keep all the drugs stored carefully to prevent bottle breakage and to keep moisture from contaminating the contents.

## FOR RELIEF OF PAIN

### Aspirin

Ingredients: Acetylsalicylic acid

Action & Uses: Use to relieve mild to moderate pain, reduce inflammation, and reduce fever.

Dosage: Two 5-grain tablets every 2-6 hours as needed with lots of water.

Adverse effects: 1. May irritate the stomach lining, causing nausea, vomiting, pain, and even bleeding. Too much aspirin can produce dizziness, mental confusion and a ringing in the ears.
2. Allergic reaction: skin rashes or symptoms like those of asthma or hay fever (Tylenol can be used in these circumstances).

Cautions: Those who have allergic sinisitis or asthma may have an allergy to aspirin.

Drug Interactions: It may interact with Diabinese or other diabetes drugs to cause a dangerous fall in blood sugar.

### Tylenol

Ingredients: Acetaminophen

Action & Uses: Use to relieve mild to moderate pain and reduce fever (it cannot reduce inflammation).

Dosage: Two tablets every 4-6 hours as needed for pain

Adverse effects: In usual dosages, there are few adverse effects. Excessive dosages can cause liver damage.

### Tylenol III

Ingredients: Acetaminophen, codeine phosphate

Action & Uses: Aceminophen is an analgesic and antipyretic; codeine is also an analgesic. This drug is indicated for relief of mild to moderate pain. It is also to be used in the field in cases of severe pain.

Dosage: Dosage should be adjusted according to the severity of the pain and the response of the patient. It may be necessary to exceed the usual dosage recommended below in cases of more severe pain or in those patients who have become tolerant to the analgesic effect of narcotics. The usual adult dose is: one or two tablets every 4 hours as required.

Adverse effects: The most frequently observed adverse reactions include lightheadedness, dizziness, sedation, nausea, and vomiting. Some of these effects may be alleviated if the patient lies down.

Warnings: Codeine can produce drug dependence and therefore has the potential to be abused. Psychic and physical dependence, and physical toleration, may develop upon repeated administration of this drug.

Cautions: May obscure the diagnosis and clinical course of victims with head injuries or abdominal conditions.

## FOR GASTRO-INTESTINAL PROBLEMS:

### Tums

Ingredients: Antacid

Action & Uses: This drug protects the stomach lining and neutralizes excess stomach acid.

Dosage: Two tablets every 2-3 hours as needed. Antacids have a more prolonged effect when taken after eating, so it is useful to take them about an hour after meals, as well as every 2 to 3 hours thereafter. Acid secretions may increase at night, so a double dose is recommended then.

Caution: Many antacids prevent the absorption of other drugs, so avoid them when taking other drugs. Do not take more than 16 tablets in a 24 hour period. Do not use the maximum dosage for more than 2 weeks.

### Polymagma

| | |
|---|---|
| Ingredients: | 500 mg. claysorb (activated attapulite), 45 mg. pectin, and 50 mg. hydrated alumina powder (micropulverized kaopectate). |
| Action & Uses: | Polymagma acts to increase the bulk of the stool, and may also absorb some of the toxins contributing to the increased movement or irratibility of the bowel. This drug provides symptomatic relief and does not usually affect the cause of diarrhea. It is most effective in the mildest forms of diarrhea. |
| Dosage: | 4 tablets initially, then 2 tablets after each loose bowel movement. |
| Adverse effects: | Constipation if used to excess. |
| Cautions: | Symptomatic relief of undiagnosed diarrhea for more than 2 days is not recommended. Examination by a physician is then advisable. |

### Lomotil

| | |
|---|---|
| Ingredients: | Diphenoxylate, atropine |
| Action & Uses: | These two compounds are used to control diarrhea through slowing of intestinal motility. |
| Dosage: | Two tablets 4 times a day is recommended. Smaller amounts are preferable if they are found to be effective. |
| Adverse effects: | Nausea, sedation, dizziness, vomiting, restlessness, abdominal discomfort, and headache. |
| Caution: | The retention of fluid within the colon may increase the toxic effects of the bacteria which inhabit the colon and may have caused the diarrhea. Diarrhea is one way the body rids itself of a toxic substance. |

## FOR INSECT STINGS

### Benadryl

| | |
|---|---|
| Ingredients: | Diphenlydramine 50 mg. |
| Action & Uses: | Use for relief from allergies, rashes, |

and itching skin; it is also a mild sedative. Benadryl is an antihistamine which blocks the effects of histamine released in the body during an allergic reaction. It is not generally used in allergic asthma.

Dosage: 50 mg. every 6 to 12 hours.

Adverse effects: Drowsiness occurs in some people.

### Isuprel

Ingredients: 10 mg. isuprel in a sublingual base.

Action & Uses: This drug is a bronchodilator; it relaxes the muscles of the bronchial tubes. It is useful in allergic reactions when benadryl is not effective.

Dosage: One tablet beneath the tongue every 2-4 hours.

Adverse effects: There may be an increase in heart rate, palpitations, high blood pressure, trembling, and dizziness. The patient should have a follow-up exam by a physician.

### Epinephrine

Ingredients: Epinephrine solution 1 ml.

Action & Uses: This is the most valuable drug for the emergency treatment of severe allergic reactions. Like isuprel, epinephrine is a bronchodilator; however, it is much more potent and faster acting.

Dosage: 1/2 ml. of epinephrine solution contained in the syringe in the Anakit. Each syringe contains 2 doses. See instructions supplied with the Anakit.

Adverse effects: Increased heart rate, palpitations, increased blood pressure, trembling, dizziness. Large doses may produce central nervous system depression and occasionally convulsions. See Anakit for more detailed information.

Cautions: If this drug is used continually the body may develop resistance or tolerance to the effect, so the drug will become less useful.

## FOR EXHAUSTION AND DEHYDRATION

### Buffered Salt Tablets

| | |
|---|---|
| Ingredients: | Sodium chloride 0.45 g., potassium chloride 30 mg., calcium carbonate 18 mg, dextrose not USP 0.2 g. |
| Action & Uses: | These tablets are used as a mineral salt replacement in the prevention of dehydration and heat cramps, which may be caused by prolonged exposure to high temperatures and excessive fluid loss from perspiration. |
| Dosage: | 1-2 tablets with at least one cup of water. Do not chew. Repeat as necessary up to 4-5 times daily. |
| Caution: | Store in a dry place. |

## ☐ SUPPLEMENTAL INFORMATION ON COMMON MEDICAL PROBLEMS

### BLISTERS

How a blister is formed: The outer part of the skin, the epidermis, is made of five layers. Four of these layers are parallel to each other. The fifth layer includes "finger" cells that point outward through the other layers, pinning them together to inhibit seperation and lateral shifting. When there is too much shearing stress, as when a boot and sock rub an area, the finger-cells fail. The layers split, fill with lymph fluid, and a blister is formed.

How to prevent blisters:

- Break in the boots to your feet. Try this: soak the boots in water; then wear them while they dry, changing socks several times.
- Remember where the blisters formed on the last trip, and apply adhesive tape there at the start of the next trip. When a "hot spot" is apparent to you, it is already too late. If the previous blister was large or severe, use moleskin instead of tape. The covering will spread and reduce sheer stress between the layers.
- If a minor hot spot (red and tender) has already formed, placing adhesive tape directly over it is a dubious operation, because the tape will adhere to the seperated layer of skin and pull it off when the tape is removed. It is better to adhere a small piece of plastic film on the tape first, and then position the plastic over the beginning blister. The tape can then be removed without pulling off the top of the blister.
- When a definite blister has or will form, a bridging technique is used to relieve the pressure. See the Instructor's Handbook for instructions on doing this. It is important to leave this preparation on for a few days until new skin is formed.
- Wear a slippery thin sock inside the heavy one. This will reduce stress on the skin; hence reduce blistering.
- Fix any pressure points inside the boot. If a blister always forms at the same spot on the heel, for example, the problem is likely due to an inwardly projecting bump of leather.
- Choose a non-abrasive sock. Some wool and polyester socks are harsh on wet skin. Test by rubbing the material between your fingers. They should feel smooth

and soft.

- When socks get wet, change to dry ones. Dirty socks, also, are more abrasive than clean ones, so change into clean socks often.

Drain the blisters? Yes. This relieves pressure, thus reduces pain. Also, a drained blister will not increase in size. It is important to leave the top layer of skin intact. Keep the blister as clean as possible, Refer to the Instructor's Handbook (p. 100) for more information on the treatment of blisters.

## DIARRHEA

This section will provide you with more information about the common forms of diarrhea in the field. Treatment is similar for all and is covered in the Instructor's Handbook (p. 100). If acute conditions persist more than 2-3 days, examination by a physician is necessary. The "incubation period" refers to the time between contact with the cause and the onset of symptoms.

Acute gastroenteritis (stomach flu): Rapidly developing, generalized abdominal distress--waves of cramps, diarrhea, and nausea. Mild chills and fever may be present. Explosive in onset; copious, watery, foul-smelling stools.

Staphylococcal enteritis: Caused by ingestion of a toxin produced by staphylococcal bacteria on food or utensils. The toxin is heat-resistant so it survives sterylization of utensils. The incubation time is 1-6 hours. Symptoms rarely last more than 5 or 6 hours. Usually more than one person gets it and the symptoms are severe.

Food allergy: The onset is sudden, frequently explosive, and usually occurs within a few minutes to a few hours after ingestion. Nausea and vomiting predominate, disappearing within a few hours or when the causative food is eliminated.

Viral enteritis: Caused by viruses which are transmitted primarily by fecal contamination of water, food or hands. The incubation period is 1-5 days. Fever may be present. The acute illness lasts one day, loose stools last for a week.

Traveler's diarrhea: Caused by fecal contamination of water and improper purification. Local residents of an area may have built up a resistance. The incubation period is 6-48 hours. Symptoms usually last 2-5 days.

Chronic mild diarrhea: Caused by changes in food, water, or surroundings, emotional disturbances, or anxiety. Symptoms are soft stools and increase in movements. No treatment is necessary.

Irritable colon syndrome: Caused by emotional upset. Constipation and diarrhea are common symptoms; other symptoms include pain in the abdomen, chest, left shoulder, and inner surface of the left arm. The pain reduces with passage of gas or feces. These may be a loss of appetite, nausea, belching, vomiting, headache, sweating, flushing, shortness of breath, sighing respirations, or hyperventilation. Stools may be small with mucous present. The disorder disappears as soon as the source of stress is eliminated.

Sources

Wilderness Camping, Vol. 5, No. 3 (1975).

## INSECT STINGS AND ANAPHYLACTIC SHOCK

Anaphylactic shock is an acute allergic reaction which includes the entire body. Insect stings are one of the more common causes of anaphylactic shock. Other causes include: ingested substances--food such as berries, fish, shellfish, and certain drugs, inhaled substances--certain dusts and pollens, and injected substances--antitoxins and drugs such as penicillin.

Every summer a lot of students and staff are stung by insects. A generalized systemic reaction can be a serious medical emergency and can result in death within 10-15 minutes. Since it is estimated that 8 in 1000 individuals are allergic to insects and that 4 of these 8 are severely sensitive, the potential for trouble is great. In fact, there are more fatalities annually due to insect stings than to snakebites.

Sometimes a person develops the allergy only after she has been stung several times, and very often a person gets a progressively more noticeable reaction with each new sting. This is a warning that a severe reaction could occur in the future. It is not possible to have a violent reaction the first time you are stung, but beware of students who say they have never been stung before--often they just don't remember it.

While some people do react allergically to flies, mosquitoes, and other insects, members of the Hymenoptera order--bees, yellow jackets, hornets, wasps, and ants--are responsible for the more serious problems.

The symptoms of anaphylactic shock or a violent allergic reaction usually appear within 15-20 minutes after being stung. Occasionally an hour may pass before the symptoms appear (Refer to the Instructor's Handbook, p. 103, for signs and symptoms).

Precautionary Measures:

Avoid things which attract insects:

- sweet foods
- rotting fruit
- patches of clover and other wildflowers
- perfumes, aftershaves, and scented shampoos
- bright colors and flowery clothing

Wear white, gray, or tan.

Do not go bare-foot or wear sandals; cover up.

Watch where you step; often there are nests in old logs lying across the trails.

If you encounter stinging insects, shout a warning to others, drop your packs and retreat (run). Do not swat the insects.

NCOBS Anakit Policy:

All staff should be thoroughly familiar with the Anakit and should have had practice in giving an injection--try injecting an orange with a water-filled syringe. Each crew must be trained in giving an injection. Two members of the crew should be designated as the Anakit team. During final expedition the team will be responsible for giving an injection if necessary. One member of the team will read the instructions and the other will actually give the injection. Training should include a simulation with an orange as above.

Mosquitoes and Other Pests

- Only females bite; they need the protein to lay eggs. The males are vegetarians.
- Mosquitoes are attracted to the warm and wet air currents that come from your body. They sense it

in their feet and must make several attempts before they land on you.
- They cannot see well, but sense your $CO_2$ emissions.
- To avoid being bitten (In order of effectiveness):

  - Wear loose, tightly woven clothing of a light color. The darker the color you wear, the more attracted they are.
  - Use insect repellent. The greater the percentage of N, N-Diethyl-meta-Toluamide it contains, the more effective it will be.
  - Camp and walk in a windy area, away from stagnant water, which is a breeding ground.
  - Eat lots of garlic with your dinner. Though not a popular remedy, some swear by it.

## SNAKE BITE

The Instructor's Handbook covers in detail the treatment for venomous snake bites (pp. 103-105). This section provides more information about snakes, bites, and venom.

The bite from a poisonous snake is serious and could possibly cause death. However, the danger has been greatly exaggerated. In the United States an average of 20 people die each year as a result of venomous snakebite; this is fewer than die of bee stings. There is, however, a high incidence of crippling and disfiguring injuries to bitten extremities.

### Snakes

Venomous snakes in the United States include the pit vipers: rattlesnakes, copperheads, and water moccasins (cottonmouths); and coral snakes. More than half the bites occur in Texas, North Carolina, Florida, Georgia, Louisiana, and Arkansas. The pit vipers are the only ones that we are likely to encounter in western North Carolina.

Pit vipers characteristically have a pit between the eye and nostril on each side of the head (Figure 1). The pit is sensitive to infra-red light rays which are emitted by warm bodies. The eyes of the pit vipers are elliptical rather than round (Figure 1). There are 1-6 fangs (normally two) and a single row of plates beneath the tail (Figure 2). The venom of the pit viper effects the circulatory system by destroying red blood cells and tissue.

Coral snakes have no pits, round pupils, and a double row of plates beneath the tail. Coloration consists of a black nose with alternating red, yellow, and black rings around the body. The venom of the coral snake affects the nervous system.

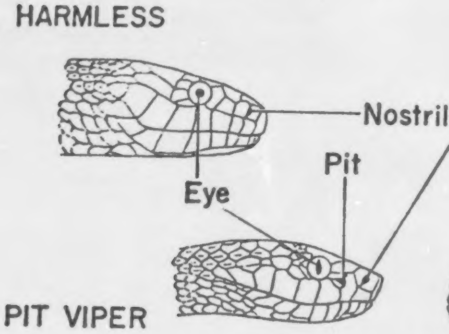

Figure 1

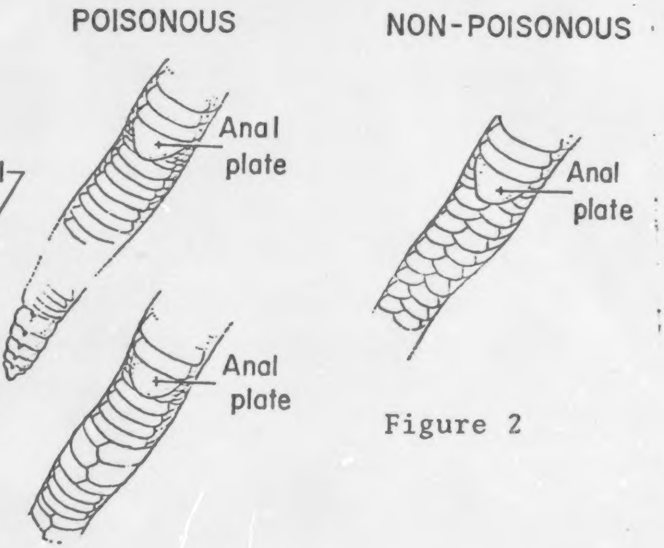

Figure 2

Bites

The symptoms of a venomous snake bite (listed in the Instructor's Handbook) appear almost immediately after the bite, making it easier to recognize. In addition, the following signs occur:

1. Usually 1-4 puncture wounds.
2. Blood in the wounds, which normally does not clot.
3. Blueish skin around the fang marks (resembling a bruise).
4. An immediate burning pain at the bite site.
5. Swelling at the fang marks. This begins immediately after the venom is injected. It spreads rapidly in all directions within 15-30 minutes.

Venom Circulation

The venom injected by pit vipers is spread through the circulatory system. Thus, the objective of first aid is to minimize circulation, particularly the venom-laden venous blood from the bite. The constricting band serves to slow down some of the venous blood; it is important that the band be loose enough so that is doesn't restrict arterial circulation as well. Since the venom spreads rapidly, a constricting band applied more than 30 minutes after the bite is of little value, and after 4 hours it serves no more purpose and should be removed. Lowering a bitten extremity will also help to slow the spread of venom.

Severity:

A number of factors influence the severity of the bite:

- The age and size of the person bitten--in a small or young person the venom will have a relatively greater effect.
- The species and size of the snake--rattlesnake bites tend to be more severe than copperhead bites. Large snakes have the capacity to inject greater amounts of venom than small snakes; the more venom injected, the more severe the bite.
- The amount of venom injected--sometimes no venom is injected at all, or a large snake will inject only a small amount of venom.
- The location, depth, and number of bites--hands and fingers are most sensitive to venom.
- The elapsed time since the bite. Rarely will a person die withing the first few hours after a bite, and in that time you can often get the victim to a hospital, where anti-venin is available.
- The victim's sensitivity to the venom.
- The time of year--bites will be more severe in the spring when the snake has just emerged from hibernation, and its venom is most concentrated.

Sources

American Red Cross, First Aid for Snakebite: Pamphlet # ARC 2189, 1978.

Conant, R.: A Field Guide to Reptiles and Amphibians of Eastern and Central North America, (Boston, 1975).

What to Do About Bites and Stings of Venomous Animals; Collier Books (New York, 1974).

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Considerations for the Cut-and-Suck Method of Treating Snakebite (for details on how to do it, consult the Instructor's Handbook, pp. 102-105).

Consider it:

- if a large timber rattler is involved.
- if evacuation is complicated and time-consuming.
- for copperhead bites on people weighing less than 100 lb.

Don't do it:

- if help is close by and can be reached within a short time.
- for copperhead bites on people over 100 lbs.
- if you have any doubt concerning the cut-and-suck method. Don't try to be a hero. Keep the person comfortable, immobolize and evacuate.
- if the bite is on the head, neck, hand, or foot--there is too great a danger of severing a nerve or artery.

Pros on the cut-and-suck method:

- may save the extremity involved.
- may prevent death.
- psychological and physical support for the victim and crew.
- gets some of the venom out.

Cons on the cut-and-suck method:

- may increase the victim's anxiety.
- if done improperly, permanent damage may result. (cutting of tendons, ligaments, veins, and arteries).
- may increase the evacuation time.
- may cause other complications (i.e. gangrene, necrosis).
- places a large responsibility on the crew during the final expedition.

## HYPOTHERMIA

Hypothermia is a decrease in body core temperature to a point where normal muscular and cerebral functions are impaired. The causes and physiology of hypothermia are covered in Mountaineering First Aid, pp. 54-57. This section will deal with the prevention, treatment, and stages of hypothermia.

### Prevention:

Awareness of the causes of hypothermia is the best prevention against it. Be alert to sudden weather changes and be able to make a quick evaluation of your crew's condition. Are there people without hats on? Are they wearing wool next to their skin? Has everyone been eating? Does everyone have on wind or rain gear? What is the condition of the weakest member of the crew? Constantly ask yourself these sorts of questions.

Adequate food and water will help to prevent hypothermia. Eat small amounts of food at frequent intervals; this helps prevent depletion of body energy reserves when several hours have elapsed since the last meal. To prevent dehydration, which would hasten the onset of exhaustion and prevent maximal use of the food you've eaten, drink at least 2 quarts of water per day. You must make a conscious effort to drink, since dehydration rarely makes one thirsty. You can never consume too many hot drinks, but avoid eating snow or drinking cold water, since it uses a lot of body energy in the form of heat to bring it up to body temperature. An increased salt intake also helps reduce dehydration.

Adjust clothing often so that you are never sweating. Moisture conducts heat away from the body 240 times as fast as air. Try not to push yourself or others to physical limits. If a situation demands that you do push yourself or your crew to the limit, consider the consequences of that decision and be sure that you can accept them.

Treatment:

If you suspect hypothermia, follow these steps:

1. Set up a tent.
2. Zip 2 sleeping bags together and ask two people to strip and get in the bags.
3. Strip wet clothing from the victim and place her in the pre-warmed sleeping bags between the bodies.
4. Give the victim hot drinks as soon as possible. Test the drink to make sure it won't burn.
5. Allow the victim to rest until she is thoroughly re-warmed. Have her eat warm, high-energy food.
6. Dress the victim in dry, pre-warmed clothes before she leaves the sleeping bag.
7. Use your judgement to decide whether or not the victim is strong enough to hike and carry a pack.

Hypothermia Drills:

These are a good way to increase awareness of hypothermia. Specific duties as above should be delegated to crew members in pairs. The duties should be practiced until the crew takes no more than 5 minutes to pitch the tent, place the victim in the sleeping bags, and light the stoves for hot drinks.

Stages of Hypothermia:

| Body Temperature in degrees | Felt by You | Observed in Others |
|---|---|---|
| 98.6 | Normal | Normal |
| 95 | Fatigue, uncontrollable shivering, fumbling cold hands, ability to perform complex tasks impaired. | Intense shivering, poor coordination, slowing of pace. |
| 91 | Violent shivering persists, feeling of deep cold and numbness, poor articulation, stumbling. | Slurred speech, violent shivering persists, poor judgement, stumbling-lurching walk. |
| 86 | Shivering decreased, muscles stiffening, disorientation, thinking not clear, exhaustion. | Irrationality, loss of contact with environment, memory lapses, jerky movements, hallucinations |
| 81 | Very drowsy, irrational, blueness of skin, weak and irregular pulse. | Stupor, blueness of skin, irregular pulse, decrease of heart and respiratory rates, dilation of pupils. |
| 78 | | Unconsciousness, coma, and finally death. |

## ☐ EMERGENCY TELEPHONE NUMBERS

Unless otherwise stated, all numbers are in the 704 area code:

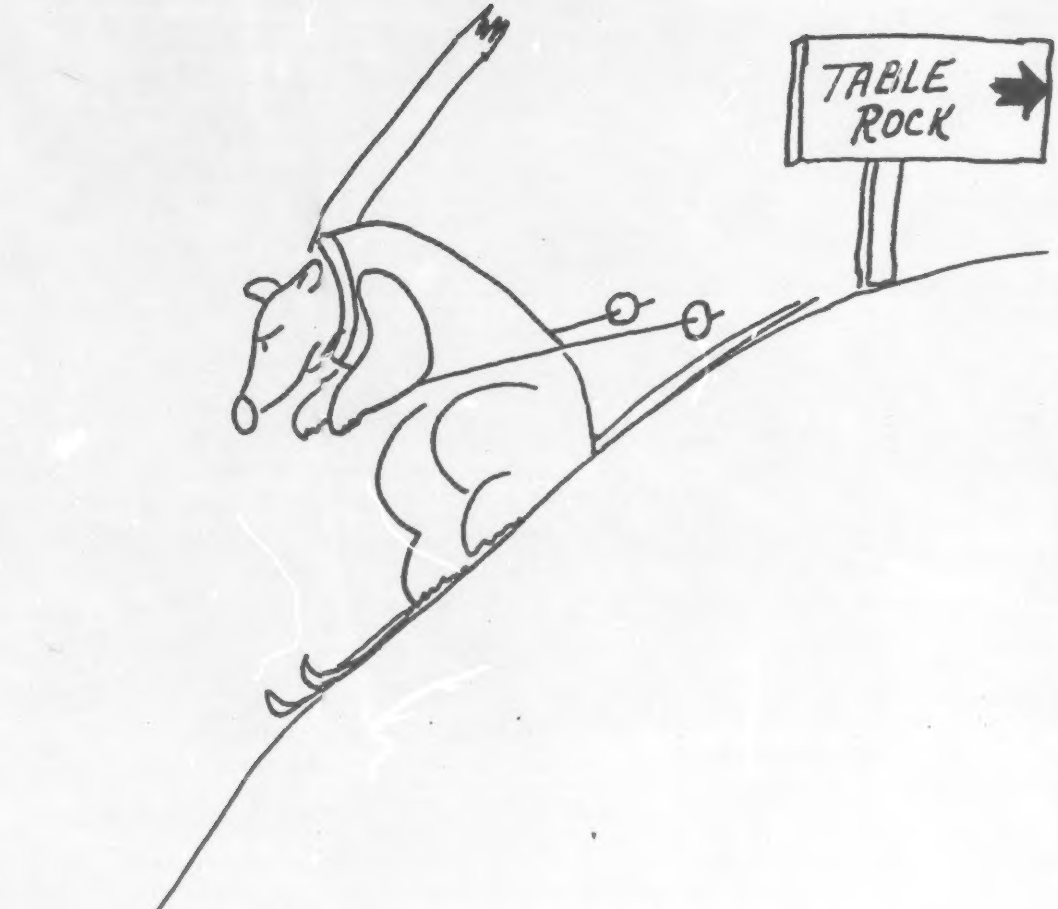
| | |
|---|---|
| NCOBS | |
| Morganton town office | 437-6112<br>437-6123 |
| Table Rock Base Buzzer | 437-6124 |
| Green Cove | 524-6748 |

Call only if there is no answer at the above numbers:

| | |
|---|---|
| Morganton home phones | |
| John Huie, Director | 433-5372 |
| Barry Carden, associate director | 433-0066 |
| Table Rock home phones | |
| Kevin O'Connor | 437-7305 |
| Ann Gehr | 433-6521 |

| | |
|---|---|
| Grace Hospital (Morganton) | 437-4511 |
| Angel Hospital (franklin) | 524-2125 |
| Burke County Sheriff: Call operator and ask. | |
| Macon County Sheriff | 524-2811 |
| Chattooga Outpost<br>Ask for director of outpost | (803)647-9014 |
| Asheville Poison Control Center | 255-4660 |

# Winter Courses



## ☐ FIRST AID

This section covers special considerations and conditions for first aid in cold weather.

Shock: Fluid loss from dehydration can cause a reduction in blood volume which is fatal if untreated. Any reduction of blood volume and circulation is much more serious in winter due to the danger of hypothermia and frostbite.

Open fractures: The exposed bone must be kept moist and not allowed to dry out. A constant supply of warm saline water is necessary to keep the bone and surrounding area from freezing.

Closed fractures: Constantly check the affected area for discoloration which might indicate poor circulation, resulting in frostbite if untreated.

Hemorrhage control: Be careful when using direct pressure to stop bleeding. You may want to gradually loosen a pressure dressing after the bleeding has stopped.

Diarrhea: Diarrhea can present several problems due to loss of fluids and direct exposure to the cold.

## ☐ FROST BITE

Frostbite is an injury resulting from frozen body tissues. The degrees of frostbite vary according to how much tissue has been damaged. The prevention and causes are covered in *Mountaineering First Aid*, pp. 52-54. This section covers recognition of the signs of frostbite once it has begun, and the aftereffects and treatment.

Susceptibility: The parts of the body most commonly affected by frostbite are the ears, nose, hands and feet. Some people are much more prone to frostbite than others. Individuals who are nervous, easily excited, and sweat profusely very commonly suffer from frostbite.

The symptoms of frostbite are progressive. First the exposed skin reddens. As exposure continues the skin takes on a gray or white, blotchy appearance, especially at the ear lobes, cheeks, and tip of the nose. Skin surfaces become numb due to reduced circulation. If the freezing process continues, all sensation is lost and the skin becomes dead white. A good way to check for circulation is to depress the affected area with your finger and watch to see what color it is. If it turns pink or red there is circulation, but if the area remains white there is no circulation. A person who has frostbite usually doesn't know it.

Frostnip is a term for incipient frostbite. Areas of the body affected by frostnip are generally exposed to the elements (faces, hands, etc.). It develops slowly and often a person is not aware of it until someone calls her attention to it. The affected part becomes white, and numbness replaces any sensation of cold or discomfort. As opposed to more severe cases of frostbite that result in damaged tissues, frostnip produces reversible changes.

Superficial frostbite: If frostnip goes untreated it becomes superficial frostbite and the subcutaneous layers of skin become involved. The affected part takes on a white and waxy appearance and feels frozen. As you press gently you will be able to feel soft and pliable tissue beneath the frozen area.

Deep frostbite involves not only the layers of skin and the underlying subcutaneous layer, but also deeper structures including muscles, tendons and bones. The affected part becomes a mottled or blotchy blue or gray. The tissue feels frozen to the touch without the underlying resilience that is characteristic of superficial frostbite.

Chemical frostbite: In very cold weather, white gas can cause superficial frostbite due to the rapid cooling of the skin caused by evaporation. If cold gas comes in contact with the eyes, there is danger of permanent damage.

## AFTEREFFECTS OF FROSTBITE

Once frostbite begins to thaw, whether on its own or due to an external source of heat, there are some noticeable signs and symptoms. Usually the affected tissue will begin to throb and be quite painful, but it is also possible that the victim may experience a warm, tingling, itchy sensation which isn't very painful and may go unnoticed.

Frostnip produces reversible changes; usually the only aftereffects are redness and slight swelling or puffiness of the tissue, after it has been re-warmed.

Superficial frostbite causes tissue damage. Deep red or purple blisters, resembling blood blisters, usually form in 24-48 hours. As blister fluids are absorbed into surrounding tissues over the next several days, the skin hardens and becomes black, forming a thick covering called carapace. Swelling accompanies the carapace and associated throbbing or aching may last for weeks. As months pass, it falls away to uncover normal new skin.

Deep frostbite may also result in blistering, but the blisters may not form for weeks. While there may be no pain immediately after the injury, severe shooting and throbbing pains may be experienced later for as long as two months. Very often deep frostbite results in permanent tissue damage which eventually leads to amputation of the affected tissue.

## TREATMENT

Frostnip can be treated by re-warming the affected area with body heat. Nose, ears, and cheeks are best re-warmed by placing a hand over them. Hands may be placed under the armpits or in the crotch; put feet on a partner's stomach.

Victims of superficial or deep frostbite will have to be evacuated as soon as possible. Handle affected parts gently to lessen the possibility of tissue damage. Cover frozen tissues lightly to protect them from contamination. Replace wet clothing with dry. The victim may walk with frozen tissue (including feet) to a road head and should then be transported without delay to medical facilities.

Do not:

- Apply pressure or a constricting bandage to a frostbitten area.
- Rub the area.
- Break any blisters.
- Attempt to thaw out the frozen tissue (this should be done under optimal conditions in a hospital where there is no danger of re-freezing).

Prevention of frostbite is the key to a successful winter course. Make students do foot checks and make them check each other's extremities. Once a student gets frostbite, she will have to leave the course.

## ☐ CLOTHING FOR A NORTH CAROLINA WINTER

### GENERAL PRINCIPLES

Clothing works best when worn in multiple layers. Due to temperature changes, wind, and exertion, garments should be easy to put on or shed. Versatile, simple gear is most useful.

Cotton readily absorbs water and has virtually no insulating value when wet. Wool also absorbs water but it retains its dead air structure when wet. Noncellular synthetic fabrics such as polyesters and acrylics absorb little water and dry very quickly with body heat. These garments have the advantages of being lighter than wool and warmer in wet conditions and the disadvantage of not being as durable as wool. Spun synthetic filament, such as polarguard and fiberfill II, is lighter for equivalent dead aid space then wool and does not collapse when wet like down. Down provides excellent insulation when dry but is useless when wet; therefore the wool and synthetic garments are preferred for use in North Carolina, where it is almost always wet.

Clothing should be loose fitting to allow freedom of movement and should overlap at all points of juncture to reduce heat loss.

## BELOW THE WAIST

Wear boxer-style underwear or gym shorts under wool pants if no long underwear is worn, to prevent chaffing of the thighs. Long underwear should be made of wool or noncellular synthetics, since they will dry out with body heat, and, if worn to bed wet, will be dry by morning. Wool-cotton blends such as duofold will not dry out with body heat and are of no use once they become wet; in fact they are a hazard. Pants should be made of closely woven, smooth-finish wool fabrics for wind-proofness and abrasion resistance. The life expectancy of pants can be extended by reinforcing the seat and knees with patches. Gaiters keep the snow out of boots and keep lower pants-legs dry. They should fit snugly around the boots and have draw strings at top and bottom. Avoid gaiters with elastic around the ankles, since the elastic may impair circulation. Gaiters with velcro and snaps or slip-on gaiters are preferable to gaiters with zippers, since zippers may freeze overnight and may be very difficult to work. Waterproof rain chaps protect the legs below the caguole. They provide more ventilation than rain pants, as well as being lighter, less expensive, and more versatile.

## ABOVE THE WAIST

An undershirt of open-weave material helps perspiration evaporate and traps a layer of dead air space when enclosed by additional layers. It should be made of a light-weight wool or synthetic material, and should be long enough to go well below the belt line. Sweaters or fuzzies are usually of a loose or open weave which creates a layer of the dead air space, but doesn't trap dead air. These garments serve best as a second layer. Shirts should be of a tightly-woven wool to help trap the dead air beneath and help shed wind and water. The shirt also protects the loose-weave garments beneath from snagging on briars and rhodos. Two layers over the underwear--wool sweater and shirt--are usually sufficient, but a polarguard vest or parka should be included for very low temperatures and periods of inactivity. Down garments are not recommended; if they're all you have, you will have to be extra careful to keep them dry. A parka that fits with street clothes on probably won't be very efficient with heavy winter clothing beneath, since most of the loft in the parka will be compressed from the inside; it should be loose fitting to allow it to work properly. Windproof garments are essential to minimize heat loss and a waterproof shell is necessary to keep insulating layers dry. A caguole meets both of these criteria; it is a good example of equipment versatility. Gore-Tex garments are even better as wind and rain gear, since they breathe, but they must be kept clean, which is not always possible on an Outward Bound course! A 60/40 parka or nylon wind shell serves only to protect you from wind or light rain.

## HEADGEAR

An unprotected head and neck can account for 1/3 - 1/2 of the body's heat loss, so it is very important that you have garments that will adequately insulate them. Wool stocking caps and balaclavas are excellent for creating dead air space but, due to their open weave, do a poor job of retaining the dead air unless covered by a shell such as the hood of a parka or caguole. A well-insulated hat of tightly woven material with good ear flaps can offer more protection than a stocking cap in very cold weather. To protect your neck you need a wool scarf or very high collars on several of your garments. A pair of heavy wool mittens worn with shells will suffice for most of the conditions in North Carolina. Extra mittens are handy if one pair becomes soaked and a pair of wool gloves or fingerless mitts is convenient for doing camp chores.

## FOOTGEAR

A major cause of cold feet is a lack of circulation caused by wearing too small a boot or too many socks. When fitting a pair of boots keep in mind that your feet swell up after a few hours of hiking, and the addition of of a 50 lb. pack makes your feet spread over a larger surface area. Winter boots should be fitted with a felt or foam in-sole plus 1 medium and 1 heavy pair of wool socks. A wool/nylon blend (no less than 80% wool) is much more durable than 100% wool. Compression of fibers reduces the dead air space on the bottom of the sock, hence the need for in-soles. There must be room to wiggle toes. Boots with bellows tongues and soft uppers will cut off circulation in the larger blood vessels that lie close to the surface on the top of the arch. A warmer boot is one with an overlapping tongue closure made out of good, stiff leather so the foot is free to move around. Beware of boots that have lots of foam padding, fashionable scree collars, soft split-leather uppers or lots of seams. Good boots will be expensive. To keep boots from freezing overnight, put them in a stuff sack in the bottom of your sleeping bag. Clean boots and treat them with a water-shedding preservative after each trip. A pair of down or polarguard booties is convenient for wearing in camp.

## ☐ FOOD

NCOBS provides 3,900 calories per person per day during the winter course, approximately 1,000 calories more per day than in the summer. The increase is in overall quantity, fats, and snack food. 2-3 high-carbohydrate snacks are provided per day, plus a greatly increased percentage of fats: more canned meats, bacon, margarine, cheese, eggs, and powered milk.

The three major food components are proteins, fats, and carbohydrates. Protein is found in meats, milk, cheese, eggs, and cereals, Fat sources are meat fats, butter, margarine, cheese , egg yolks, and nuts. Carbohydrates include all sugars and starches found in cereals, legumes, milk, vegetables, fruits, bread, and candy.

Carbohydrates are the most rapidly and efficiently converted into energy; they will produce heat promptly, but only for a short period of time. Proteins and fats are more slowly digested; they release energy over a longer period of time. For quick warmth, eat carbohydrates. For prolonged heat production, consume fats and proteins. Eating cheese before retiring will help you stay warm on cold winter nights.

The body also uses a lot of water during strenuous winter activity. Water is lost through respiration in cold temperatures, as well as through perspiration. In addition, it is also needed to aid in the digestion of the increased fat and protein intake.

## ☐ TIPS ON WINTER EQUIPMENT

A summary of hints and suggestions that may help make your course a little easier.

Tents: The tents used for winter courses have a double A-frame suspension with a catenary cut in the ridge to shed wind. These tents are very stable in a strong wind when set up correctly:

1. Clear the area of rocks and sticks, and use a ground cloth to protect the floor of the tent.
2. Stake the corners out snugly.
3. Thread the poles through the sleeves and secure them. Stake out ridge lines first, then the sides.
4. Place the fly on the tent with the reinforced sections over the poles. Stake out the ridge lines, the four corners, and then the sides.

If possible, try to pitch the tent with one end into the wind. This causes the tent to distend, equalizing interior and exterior pressure, which will minimize flapping. The tent should always be ventilated to minimize condensation. Keeping the tent completely zipped up provides little additional warmth and will leave your gear damp.

Stoves: Self-pressurizing stoves such as a Svea 123 should be insulated from the ground with a small piece of ensolite. The leather gasket on the pump of the Optimus 111-B or Peak 1 may freeze and prevent the stove from pressurizing; you may need to take the gasket out and warm it in your hand. Always cover the pots when boiling water. Protect stoves from wind.

Sleeping: The foam pads issued for winter are made of closed-cell foam, which will not breathe, so body moisture will build up between the bag and the pad unless a layer of clothing is placed between. If your feet hang off the end of the pad, put several layers of clothing beneath them. Massage and warm your feet every night, put on dry socks, and put your wet ones around your mid-section to dry. Always wear a hat to bed. Your water bottle and boots will make more comfortable sleeping companions is they are inside stuff sacks. Don't drink any cold liquids before going to bed.

Stuff sacks: No stuff sack is completely waterproof. If it is important that an item stay dry, line the stuff sack with a plastic bag.

Parkas: Don't let students wear their parkas in rainy or snowy weather, since they will surely become wet, even under a caguole. Check to make sure parkas have been properly put away in stuff sacks.

Conserving energy: Carry a light pack; you'll sleep warmer and have a better trip. Adopt a pace you can hold all day long.

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# Appendices

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## ORIGINS OF NAMES

Appalachian - tribe of Muskogean stock who lived in northern Florida. Prominent in DeSoto chronicles.

Burnsville - for Captain Otway Burns, commander of privateer Snapdragon in the War of 1812.

Big Tom*-- for Big Tom Wilson, bearhunter, mountain man from Caney River. He shot 113 bears, his son Adolph got 112, then quit, his grandson Ewart has 60, and great grandson Ned is just starting killing bears as well (source dated 1965).

Carolina - for Charles I of England.

Cartoogechaye - means "town beyond" in Cherokee.

Chair Maker Branch - named for a man who made chairs there.

Chattahoochee - Cherokee for "painted stone" or "marked rock".

Chattooga - Cherokee for "someone has crossed the river" or "drank by sips".

Chatuge - Cherokee for "meeting of the waters".

Cherokee - perhaps from Creek word "tciloki", which means "people of a different speech".

Chunky Gal - A young Indian man from Macon County and a well-padded Indian girl eloped. Her father opposed the marriage and sent a posse of braves to overtake them. They caught the two and forced "Chunky Gal" to return to her village.

Clayton - named for Augustin Smith Clayton, attorney, Georgia legislator, jurist, and U.S. Representative (1783-1839).

Clingman's Dome* - named for General Thomas Clingman.

Compass Creek - Robert Henry (doctor-surveyor) dropped his compass as he was crossing the stream.

Couch Gap - draft dodgers and bushwhackers of the Civil War hid under the cliffs there.

Cullasaja - Cherokee meaning "sweet water", "sugar water", or "pouring sugar".

Ellijay - Cherokee for "verdant earth".

Fire's Creek - for the man who lived there.

Franklin - for Jesse Franklin, governor (1820-21) and twice a U.S. senator.

Hurricane Creek - a hurricane blew down all of the trees on the creek.

Jonas Ridge* - for Jonas Braswell, who froze to death under a rock on that ridge while on a trip across the mountain.

Julia Knob - for a slave whom Robert Henry owned. When set free, she was allowed to build a house at the foot of this mountain.

Licklog - named by the Davis family who felled trees not far from the church in that vicinity. They cut notches in the logs and put salt in them for their stock.

Linville* - for William Linville. He and his sons were killed and scalped by Indians on the Linville River in 1766.

Macon - for Nathaniel Macon, a N.C. politician known and loved for his "amazing sincerity". He was first elected to the House in 1791.

Kona - Lawson, the first dispatcher for the railway that built the town, named it Kona because it was short, easy to spell and easily understood when spoken.

Mitchell* - for Elisha Mitchell of University of North Carolina.

Morganton - for General Dan Morgan, a poor Pennsylvania waggoner who developed into a brilliant military leader. His victory at Cowpens was considered one of the great achievements of the Revolution. When asked what part he played in the Revolution, he said "Fought everywhere, surrendered nowhere".

Nantahala - Cherokee for "land of the Noon-day sun". The gorge of the Nantahala is so deep and straight that the sun only reaches it at mid-day.

Pisgah - biblical reference: where Moses viewed the promised land.

Potrock Bald - a large rock on top of this mountain appears to have been hollowed out. The Cherokee medicine man supposedly steeped his healing herb juices here.

Relief - a merchant in this community put up a patent medicine called "Hart's Relief". With its high alcoholic content, the concoction made folks feel great, and they flocked to the little town to get "Relief". When the first postmaster was asked for a name for the town, this one seemed logical.

Rutherford* - for General Griffith Rutherford, who, in the Revolutionary War was responsible for defeating the pro-British Cherokees. He fought primarily in and around McDowell County (Pigeon River, Swannanoa Valley).

Satulah - some sources say it is a word for a demon.

Shooting Creek - where pioneers would meet and have shooting matches. Prizes were calves, deer, or bear. The winner generally divided the take with other competitors.

Siler's Bald - Jacob Siler bought Balltown George's (a Cherokee) place in 1819 for 25¢ an acre. He built a shack, brought in his brothers, and called it a store.

Standing Indian - a brave who was stationed on the peak deserted his post when bolts of lightning from the Great Spirit split the air. He was turned to stone for his cowardice and still appears at his eternal vigil. The Great Spirit had released the bolts to destroy a monster's mountain haven. The beast (with widespread wings and beady eyes) had swept down and carried away a Cherokee child.

Sugar Cove - once the location of many sugar maples, which were cut down for cornfields and flooring.

Toe River* - short for Estatoe, who was an Indian maiden and the heroine in a Cherokee legend.

Valdese - named for Waldensians, German religious followers of Peter Waldo.

Watauga - Cherokee word, meaning lost. Believed to possibly

Watauga - Cherokee word, meaning lost. Believed to possibly mean "river of plenty", "beautiful water", "river of islands", or "foaming at the mouth".

Wayah Gap - Indian word for "wolf".

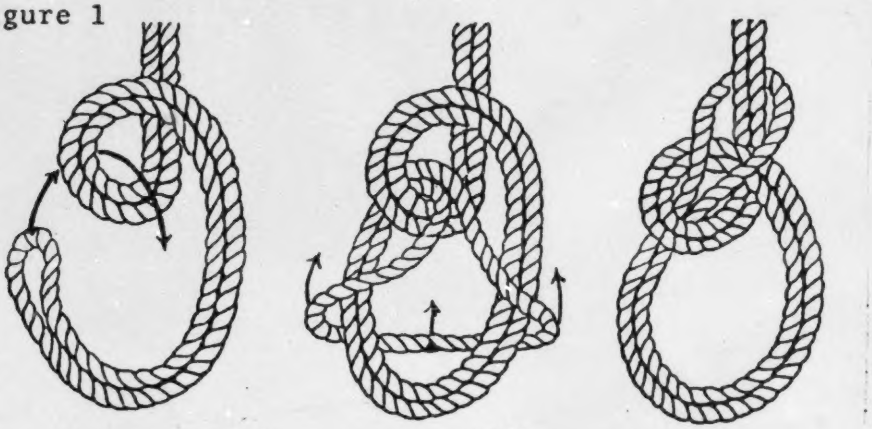
Wiseman's View - William Wiseman, who stowed away from England to America as a small boy in 1746.

Names with asterisks (*) are referred to in the "Human History" section of this manual.

## APPENDIX 2: KNOTS

Bowline on a bight: (Figure 1) Used for belaying the litter attendants during a horizontal litter lower.

Figure 1



Butterfly: (Figure 2) Used where a load is applied directly to the rope. This knot forms a single loop, and is easy to untie after loading. Used in a "transport knot system".

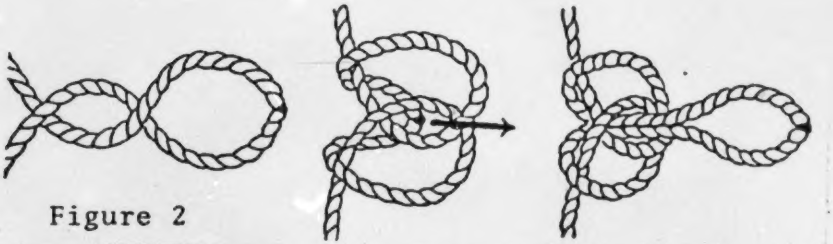
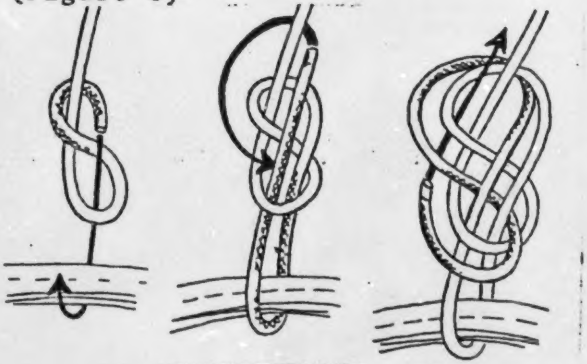


Figure 2

Figure-8 follow-through: (Figure 3) Used to tie a rope into waist wraps, swami belts, climbing harnesses, etc.

Figure 3



Prusik-on-a-prusik: Used mainly on litter lowers for tying attendants into load lines. Tie a sling loop around your finger with a prusik knot; then slip the bight at the other end of the loop through the knot in place of your finger.

Water knot: (Figure 4) Commonly used to join the ends of of sling webbing to make continuous loops. Use for anchors, runners, for tying the ends of a swiss seat together. A strong knot, it tends to loosen in use and should be inspected frequently. Always leave at least a 2 inch tail.

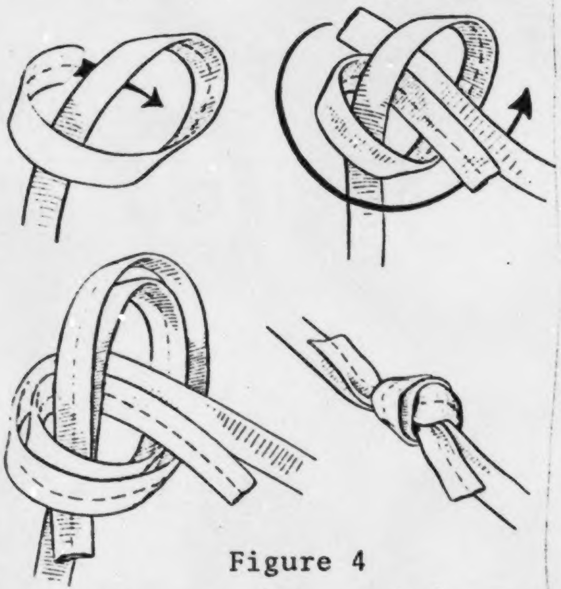


Figure 4

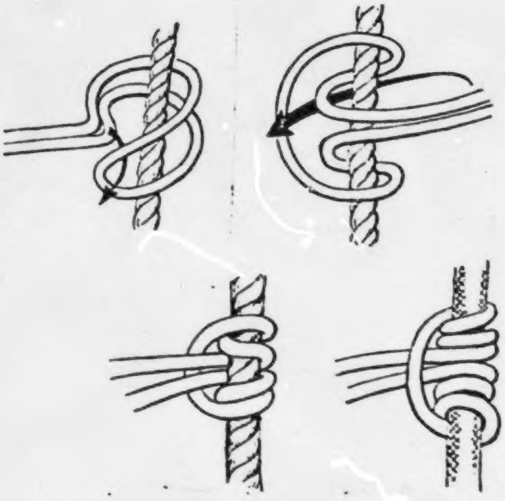


Figure 5

Triple wrap prusik: (Figure 5) Increases friction by adding an additional wrap to a two-loop prusik. A triple-wrap prusik will hold better on a loaded rope.

Bachman knot: (Figure 6) This knot is useful in pulley systems and Bachman haul systems.

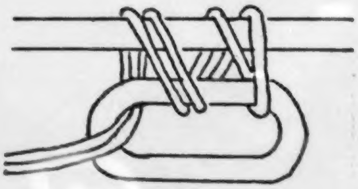
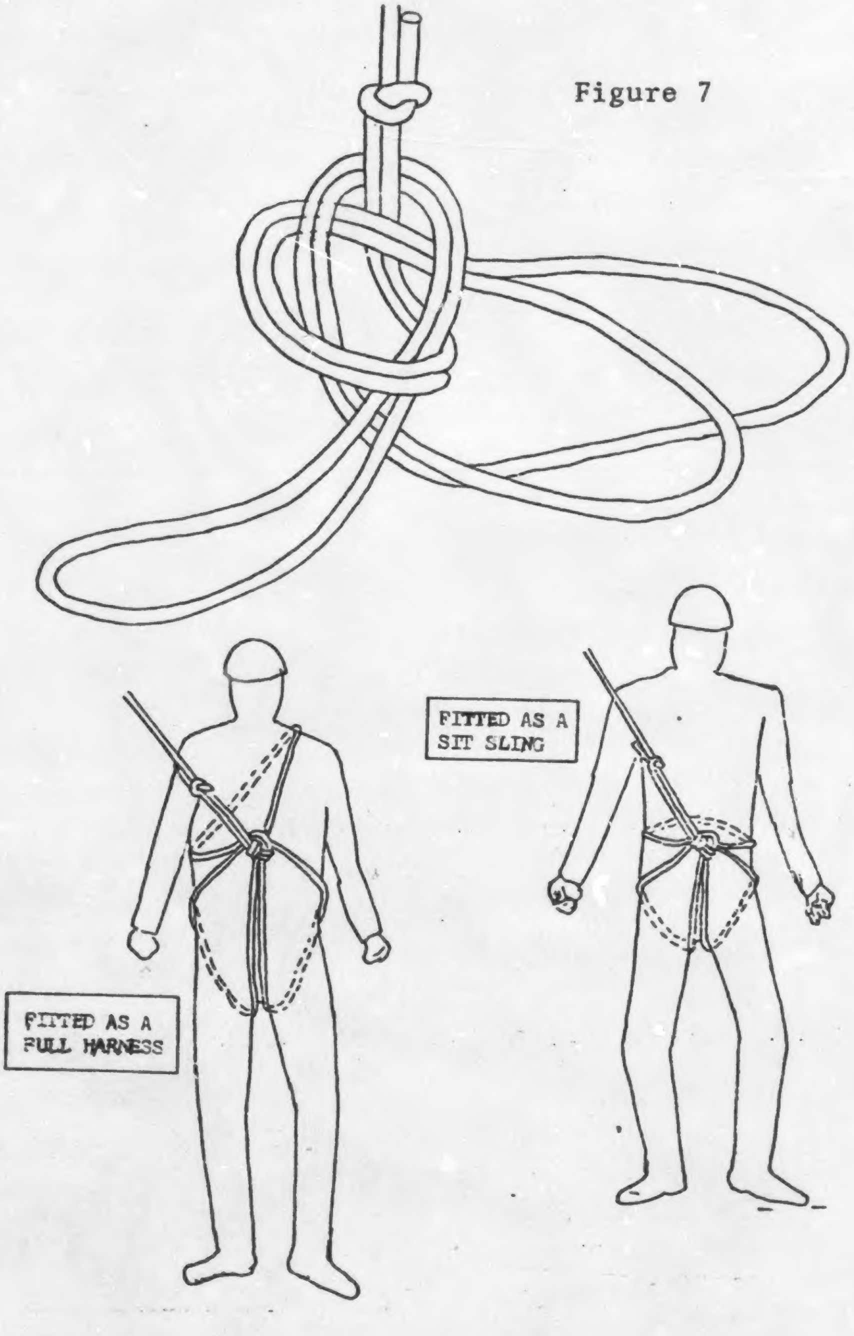


Figure 6

Triple bowline: (Figure 7) A bowline tied on the bight of a rope gives 3 loops which can be worn as a sit sling, or a full sling.

Figure 7


FITTED AS A SIT SLING
FITTED AS A FULL HARNESS

Instructor tie in: Using 15 feet of one inch tubular webbing, tie a loop using a water knot, then girth hitch it around the waist and tie it off with an overhand knot.

Transport knot: (Figure 8) used to tighten load lines for a Tyrolean traverse or Telpher evacuation.

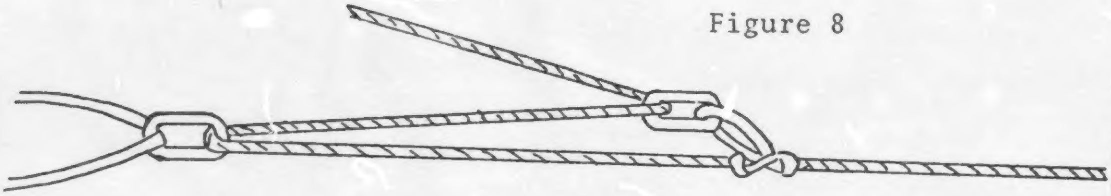
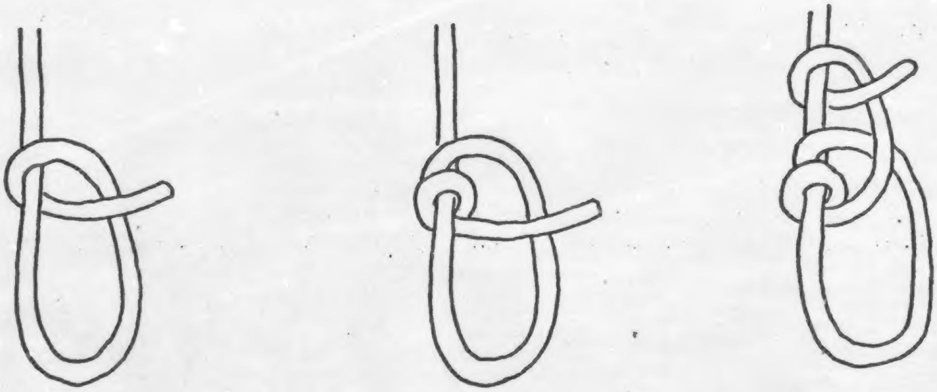


Figure 8

Tautline hitch: (Figure 9) used to tighten tarp and tent lines.

Figure 9



**Mariner's knot:** (Figure 10) Used to anchor a loaded line, and can be untied while the line is still loaded. Be sure to use a long prusik sling which will easily reach the anchor.

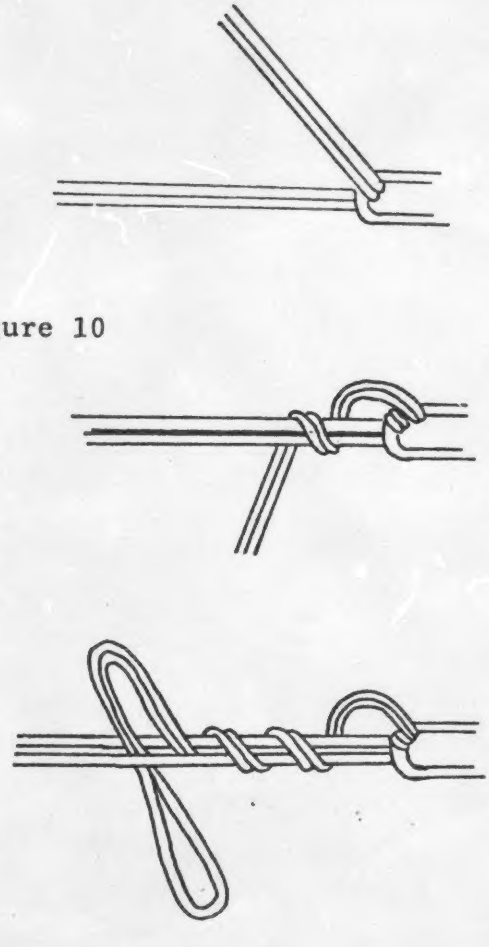


Figure 10

# INDEX

- Activities (see individual)
- ALCOA 77
- Anakit 170, 176, 181
- Anchors (climbing) 154
- Andrews Creek 7
- Appalachian
  - Formation 67
  - Mountains 67
  - Music 83, 97
  - People 3, 19, 71, 80
  - Regional Commission 77
  - Regional Development Act 77-78
- Armstrong Creek 8 , 73

- Bachman Haul System 150
- Backcountry, Ethics 101
  - Policies 101
  - Others Use of 107
- Balance Beam (ropes course)
- Bartram, William 75
- Battle of the Horseshoe 74
  - King's Mountain
- Beaver 91
- Bee Branch 9
- Beestings 170, 175-176, 180-181
- Big Yellow Mountain 75
- Bins 46
- Birth Canal (ropes course) 141, 164
- Bivouacs 130
- Black Dome (Mt. Mitchell) 32, 72, 75, 107
- Blisters 178
- Blockaders 178
- Bluegrass Music 83
- Boone's Fork 10
- Brakes, Double Carabiner 153
  - Figure-8 152
  - Sticht Plate 152
- Breathtaker (ropes course) 141, 164
- Bright's Spring 73
- Brown's Creek 73
- Brown Mountain 96
- Buck Creek 82
- Buckeye Creek 23
- Burntrock Ridge 97
- Bushwhacking 75, 108

- Camping Regulations
  - Chattooga River 33
- Campsites
  - Chattooga 34-39
  - Toe River 32
  - Worley's Cave 41
- Cane River 32
- Cape Sable 107
- Catawba, Indians 71-72
  - River 73
- Cave, Activities 130
  - Campsites 41
  - Ethics 109
  - Formations 68
  - Leaders 141
  - Worley's 40-43, 68
- Chattooga River, Campsite Regulations for Use 34-39
- Cherokee, History 71-74
  - Removal 73-74
- Civilian Conservation Corps 77
- Climbers, Requirements for Leaders 142
- Clinchfield Railroad 76
- Clothing, Winter 192-195
- Clouds 113-115
- Coal 76
- Crafts 78
- Crickets, Telling the Temperature by 116
- Crockett, Davy 74
- Crops, Mountain Farm 19
- Cut & Suck Method, Snakebite 184-185

Dalton, Rufus 20
Dams, Fontana 77
  Queen's Lake 77
  Lake James 77
"Deliverance", Impact of 33
Deyton Bend 83
Diarrhea 175, 179
Dillard, John 73
Dobson's Knob 11
Driver's Direction File 56
Driver's Qualification File 56
Driving Policies 55
Drugs 170, 172-177
Dryman's Fork 24
Duke Power Company 77

Earl's Ford 35
Eastern Wilderness Act 80
Emergency Telephone Numbers 188
Environment, Impact of School on
  3, 33
Entrance Tube (ropes course)
  140, 164
Estatoe Myth 32
Expeditions, Preparation for 47
  Routes, History of 73

Fall Creek 36
Feller, George & Kathy 82
Ferguson, Colonel 73
Feuds 82
Field Manual, Purpose (cover page)
  Explanation (cover page)
Fires 101-103
First Aid, Drugs 170, 172-177
  Kit, Crew 170-171
  Kit, Vehicle 171-172
  Simulations 133-136
Flatrock, North Carolina 82
Flowstone 69
Fog 115
Fontana Dam 77
Food 58-64, 195
Forest Service 3, 20
Fractures, Winter Considerations for treating 190
French and Indian War 72
Fronts, Weather 113
Frostbite 190-191
Frostnip 190-191

Galax 78
Geologic History 67-70
Ginseng 78, 88
Gold, Found in NC 71, 76
Green Cove 19-31
Group Activites 126-137
  Solo 131
  Initiatives 126-137
Guyot, Arnold 75

Handbook, Instructor's
  (see Purpose)
Harper's Creek 80
Harris Creek 12
History, Geologic 67-70
  Human 71-79
  Natural 85-95
Honeycutt Branch 73
Horizontal Rope Ladder
  (ropes course) 141, 154
Hourglass (ropes course)
  140, 164
Howard-McGhee feud 82
Hydroelectric Power 77
Hygiene 103-104
Hypothermia 185

Indians, Catawba 71-72
  Cherokee 71-74
  Removal 73-74
Initiative Games 126-129
Insect Stings 180-181
Instructor's Handbook
  (see Purpose)
Irish Creek 13

Jackson, President Andrew
  74
Jonas Ridge 3, 75, appendix
Junaluska 74
Justis Family 19

Karst Areas 68
Kirk's Raiders 75

- Lake James 77
- Latrines 103
- Lead Climbers 142
- Lease (Table Rock base) 3
- Lick Log Branch 25
- Lightning 117-124
- Linville, Gorge 80
  - River 32
  - William 72
- Litter, Considerations 110
  - "The Litter That Lingers"
- Litter Carries 155
- Little Tennessee River 32, 72, 82
- Lloyd Cove 26
- Lowry, Mrs. Haskall 40
- Lumber Industry 20, 76

- Maps 48
- Medical Problems (common) 178
- Meteorites 98
- Meyer, Dan 20
- Michaux, Andre 75
- Mining 76 , 80
- Moon, Telling Time by 98
- Moonshine (corn liquor) 81
- Mosquitoes 180-181
- Moulages 134
- Mt. Mitchell 32, 72, 75, 107
- Music, Mountain 83, 97

- Nantahala, National Forest 19
  - Outdoor Center 33
  - River 32, 77
- Natural Phenomena 96
- Nichols Family 19
- Night Activities 130
- Nolichucky River 32
- North Cove 73
- North Toe River 32

- Oconoluftee River 72
- Over-the-Mountain Boys 73

- Paleozoic Era, in NC 68
- Perry Creek 27
- "Pioneers", the 20
- Pisgah National Forest 19
- Pleistocene Ice Sheet, in NC 67
- Pliocene Era, in NC 68
- Policies, Backcountry 101
  - Driving 55
  - Logistics 46
- Postman's Walk (ropes course) 140, 164
- Pounding Mill Creek 28
- Prohibition 81
- Public Relations (Worley's Cave) 41
- Purpose (of Field Manual) see cover page

- Quaker Meadows 73
- Qualla Reservation 74

- Railroad Passage (Worley's Cave) 42
- Railroads 76
- RARE (Roadless Area Review & Evaluation) 80
- Red Hill Bridge 32
- Relief 32
- Responsibilities,
  - for Equipment 46-47
  - to Logistics Staff 47
- Resupplies 47
- Revolutionary War 72
- Rhododendrons,
  - on Bushwhacks 108
  - for Profit 78
  - as Thermometers 116
- Rimstone dams 69
- Roan Mountain 73, 75,32,97
- Roaring Creek 73
- Rockefeller, John D 80
- Ropes Course 138-141, 163
- Ross, John 74
- Russell Bridge 34
- Rutherford, General Griffith 72

- Safety, Fires 102
  - Policies see Instructor's Handbook
  - Ropes Course 138-141, 163
  - Stoves 50
  - Vehicles 55
- Scotch-Irish Settlers 72
- Scott, General Winfield 74
- Search 146
- Sequoia 73
- Service, Caving 109
  - Campsite Rehabilitation 105-106
- Settlement of Mountains 71
- Shining Rock 80
- Shook Creek 27
- Shortoff Mountain 14
- Silver, Francie 83
- Sky Watch 130
- Solo, Activities 129
  - Cave 131
  - Food 59
  - Sites 6, 23
- deSoto, Hernando 71
- Spanish Explorers 71
- Special Use Permit (Table Rock Base Camp) 3
- Stackrock Creek 15
- Stars, Navigation by 98
- Stills (whiskey) 81
- Stoves, Operation 50.51, 53
  - Repair 51-53
- Sun, Telling Time by 98

- Table Rock Base Camp 3
- Telephone Numbers 167, 188
- Telpher Line 159
- Temperature, How to Tell It 116
- Tennessee Valley Authority (TVA) 77
- Tessentee Creek 30
- Time, How to Tell It 98-100
- Toe River 32
- Trail of Tears 73
- Treaty of Long Island (Holston River) 72
- Tree Activities 126
- Tsali (Charley) 74
- Tyrolean Traverse 137

- Unaka Mountains 67, 75
- Uplift, Geologic 67

- Valuables, Storage of Students' 47
- Vehicles
  - First Aid Kits 171
  - Personal 55
  - Policies 55
  - Repair Kits in 56
- Vertical Litter Lower 157
- Virgin Passage 42

- Wars, Civil 75
  - French and Indian 72
  - Revolutionary 72
- Webb Creek 16
- Whiterock 20
- Wild and Scenic Rivers System 33
- Wilderness Act 80
- Wildlife 88-95
- Wilson, Big Tom 75
- Wilson's Creek 17
- Wind 112
- Winding Stairs Road 75
- Woodall Shoals 39
- Worley's Cave 40, 68

- Yellow Mountain Road 73

- Z-Drag 149
- Zip Wire (ropes course) 141, 164
- Zip Wire, Rescue 166